

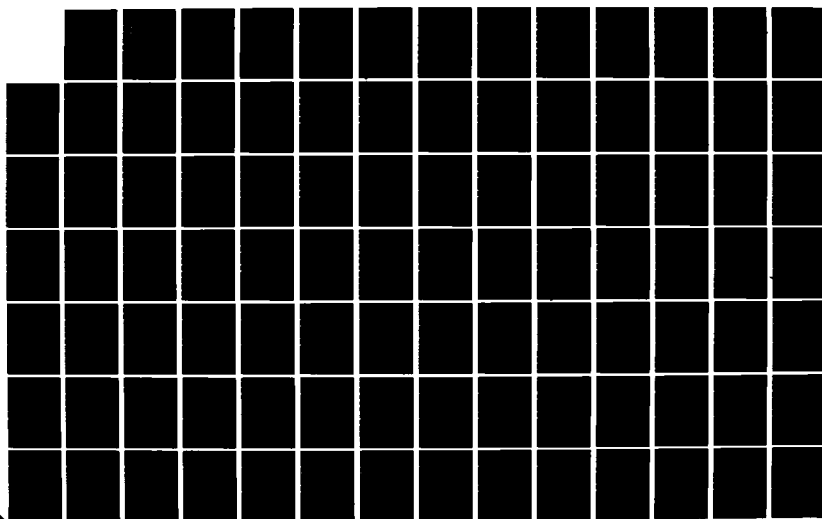
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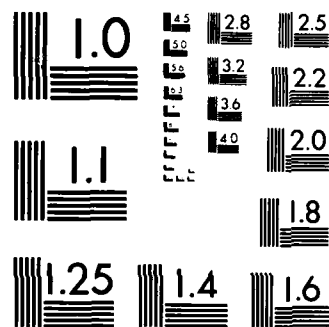
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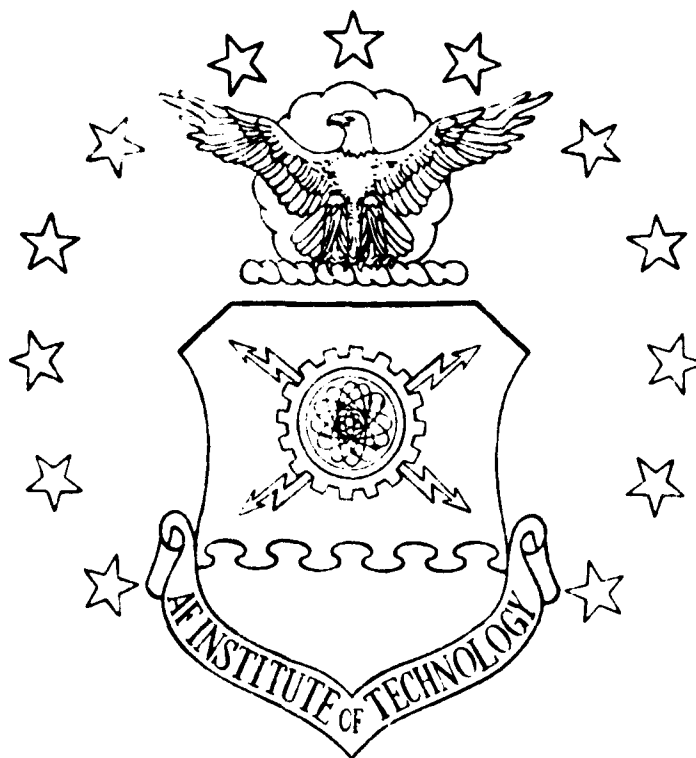
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STRESSFUL LIFE EVENTS:
THEIR RELATIONSHIPS WITH
CORONARY HEART DISEASE

Captain Charles C. Sparkman, USAF

LSSR-22-83

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER LSSR 22-83	2. GOVT ACCESSION NO. AD A34 274	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) STRESSFUL LIFE EVENTS: THEIR RELATIONSHIPS WITH CORONARY HEART DISEASE		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis
7. AUTHOR(s) Charles C. Sparkman, Captain, USAF		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS School of Systems and Logistics Air Force Institute of Technology, WPAFB OH		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS Department of Communication AFIT/LSH, WPAFB OH 45433		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE September 1983
		13. NUMBER OF PAGES 126
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Approved for public release: LAW AFR 190-17. LYNN E. WOLAVER Dean for Research and Professional Development Air Force Institute of Technology (ATC) Wright-Patterson AFB OH 45433 15 SEP 1983		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Stress (Psychology) Cortisol Stress (Physiology) Stressful Life Events (SLE) Coronary Disease Stress Assessment Package (SAP) Cholesterol Life Events Survey (LES)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Thesis Chairman: Nestor K. Ovalle, II, Major, USAF		

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Exposure to stress is common and potentially dangerous. Stressful life events have been found by researchers to be related to various illnesses including coronary heart disease. The cost associated to coronary heart disease in the United States was estimated in 1976 by the American Heart Association to be \$26.7 billion per year. The faculty of the Air Force Institute of Technology developed a Life Events Survey (LES) and administered it to a convenience sample of stress seminar participants to examine the relationships of individual and organizational variables with coronary heart disease. The LES data included values assigned by the participants to variables associated with 83 stressful life events (SLE). Demographic data and blood samples were also collected from the sampled LES participants. Statistical analyses were performed with this data in an effort to determine the correlation (and not the causality) of SLE variables with three physiological predictors of potential for coronary heart disease (cholesterol, high density lipoprotein (HDL) cholesterol, and the ratio of total cholesterol to HDL cholesterol) and a measure of physiological stress (cortisol). The most significant finding of this cross-sectional study was the persistent significance of relationships between SLE variables and cortisol.

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LSSR 22-83

STRESSFUL LIFE EVENTS:
THEIR RELATIONSHIPS WITH
CORONARY HEART DISEASE

A Thesis

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the
Degree of Master of Science in Systems Management

By

Charles C. Sparkman, BSCE
Captain, USAF

September 1983

Approved for public release;
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This thesis, written by

Captain Charles C. Sparkman

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN SYSTEMS MANAGEMENT

DATE: 28 September 1983


COMMITTEE CHAIRMAN


READER

ACKNOWLEDGEMENTS

I thank Major Nestor K. Ovalle, II, for his guidance, ideas, and availability as my thesis advisor. His impetus inspired my early completion of this thesis.

I also thank the faculty of the Air Force Institute of Technology for their skill in preparing me for this and future tasks.

Finally, I thank my family for the support, love, and understanding they gave me during my graduate studies. If it were not for their support and sacrifices, this thesis and my graduation would not have been possible.

TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENTS	iii
CHAPTER	
1. INTRODUCTION	1
2. LITERATURE REVIEW.	5
Stress.	5
Causes of Stress.	7
Dysfunctions Associated with Stress	9
Coronary Heart Disease	15
Causes of CHD.	15
Indicators of CHD	18
Purpose of Research	21
Research Objective and Questions	22
Summary	25
3. METHODOLOGY.	27
Sample Population	27
Data Collection.	29
Data Reliability	31
Data Manipulation	33
LES Data	33
Transformed Data.	34
Data Analyses	36
Summary	37

CHAPTER	PAGE
4. ANALYSIS AND RESULTS.	38
Research Question 1	40
Research Question 2	41
Research Question 3	41
Research Question 4	42
Research Question 5	42
Research Question 6	43
Research Question 7	43
Research Question 8	44
Summary	45
5. CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH.	46
Conclusions	46
Future Research.	48
Final Remarks	49
APPENDICES	51
A. DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE POPULATION.	52
B. STRESS ASSESSMENT PACKAGE (VERSION 2)	55
C. LIFE EVENTS SURVEY	77
D. SUMMARY OF THE SAMPLED LIFE EVENTS SURVEY RESPONSES: MAJOR, MINOR, AND CONTINUOUS STRESSFUL LIFE EVENTS -- IN ORDER OF LIFE EVENTS AND IN ORDER OF THE NUMBER OF CASES	86
E. PEARSON CORRELATION COEFFICIENT MATRICES	95
F. MULTIPLE REGRESSION SUMMARY TABLES	99

	PAGE
SELECTED BIBLIOGRAPHY.	106
A. REFERENCES CITED	107
B. RELATED SOURCES	115

CHAPTER 1

INTRODUCTION

Coronary heart disease -- angina pectoris, acute myocardial infarction, and sudden coronary death -- is a twentieth century disease (Rahe, 1979a). One-third of all deaths, and three-fifths of those due to cardiovascular diseases, can be attributed to coronary heart disease (House, 1974). From 1950 to 1973, the death rate associated with coronary heart disease (CHD) of men in England and Wales, ages 25 to 44, has doubled (Cooper & Davidson, 1982). In 1976, the American Heart Association estimated the cost associated with cardiovascular disease in the United States to be \$26.7 billion per year. CHD is by far the most serious of the cardiovascular diseases, and the greatest source of death and disability (House, 1974).

"Heart disease is the leading nonaccidental cause of death in the Air Force" (United States Air Force, 1981, p.1). Death and disability due to coronary heart disease affects 500 to 800 Air Force people each year and costs the United States Air Force \$50 million annually (DeHart, 1980). The most common age for heart attack victims in the Air Force is 40 (Troxler & Wetzler, 1981). DeHart believes "in-flight incapacitation due to 'heart attack' is a real

possibility" (1980, p.1057); and that "up to 20 percent of Air Force pilots could have a significant degree of coronary atherosclerosis" (United States Air Force, 1981, p.2).

"The basic mechanisms leading to the development of CHD...are not fully understood" (DeHart, 1980, p.1057). There has been increased attention from physiologists, epidemiologists, sociologists, and others in the factors possibly related to the causes of CHD (Epstein, 1965; Grahm & Reeder, 1972; Horan & Gray, 1974; House, 1974; Jenkins, 1971; Levi, 1971; Rabkin & Struening, 1976; Reeder, 1967). It has only been recently that researchers have been able to start defining the relationship between heart disease and stress (House, 1974).

Stress cannot be avoided; it is a part of life (Selye, 1974). Military life is full of stressful situations, some intentional -- basic training, officer training, escape and evasion training, survival training, and other combat related training -- and some not meant to be stressful -- moves to another assignment, retirement, duty restraints, missed promotion, remote assignments, time and resource restraints to do the job right the first time (just to mention a few situations). Exposure to stress in the military is common and potentially dangerous. Air Force officers are evaluated at least annually by their supervisor on their adaptability to stress. Several researchers have focused their stress research on military sample populations

(Bunner, 1982; DeHart, 1980; Fye & Staton, 1981; Haakonson, 1980; Jennings, Rose, & Kreuz, 1974; Martin & Simard, 1982; McDonald, 1982; Rahe, 1975, 1979; Rahe, Ryman, & Ward, 1980; Sarason & Johnson, 1979; Troxler & Wetzler, 1981; United States Air Force, 1981; Ursano, 1980).

Increasing knowledge of stress and its effects on the human body may reduce the risk of coronary heart disease. As the stress-CHD relationship is better defined, CHD prevention programs can be designed to educate and treat people identified as having a high risk of CHD onset (DeHart, 1980; Troxler & Wetzler, 1981).

This research effort was a continuation of the research conducted by Bunner (1982). Statistical analyses were performed on the data collected by the Life Events Survey described in Bunner (1982), in addition to the data gathered through the background and demographics information section of the Stress Assessment Package, Version 2 (SAP-2) (Martin & Simard, 1982), and the blood tests from the same population. The focus of this research was on the correlation (and not the causality) of stressful life events (SLE) -- their occurrence, frequency of occurrence, individual's negative and positive perceptions of the SLE, and the extent of stress perceived by the individual -- with three physiological predictors of potential for coronary heart disease (cholesterol, high density lipoprotein (HDL) cholesterol, and the ratio of total cholesterol to HDL

cholesterol) and a measure of physiological stress
(cortisol).

CHAPTER 2

LITERATURE REVIEW

This literature review will provide a general background of the subject areas addressed in this thesis and an understanding of what this research effort attempted to find. The first section of the review will cover a conceptual definition of "stress," some concepts of the causes of stress, and a look at dysfunctions associated with stress. Next, the review will concentrate on coronary heart disease (CHD), what CHD is, what are some of the causes leading to the onset of CHD, and physiological measures used by researchers and medical doctors, alike, to predict the potential for CHD and to measure the physiological stress of people. Finally, this review contains a review of the Life Events Survey (Bunner, 1982), the research objectives, and the specific research questions of this thesis.

Stress

Stress is an interesting phenomenon. First, there is no universal definition of "stress" (Beehr & Newman, 1978; Lazarus, 1971; Levine & Scotch; 1970; Reeder, 1967; Warheit, 1979). House (1974) found "stress" defined only in very general terms in reviews such as, Appley and Trumbull

(1967), and Lazarus (1966). Middlemist and Hitt (1981) defined "stress" as "a force that creates physiological or psychological strain" (Allen, Hitt, & Greer, 1982, p.359). In general, "stress" has been used to represent an organism's reactions to conditions, stressors, or agents in the psychological, social, cultural, or physical environment (Lazarus, 1971; Rabkin & Struening, 1976; Warheit, 1979). Even though the physiological definition of "stress" gained a consensus among some researchers, behavioral scientists still do not have a generally agreed upon definition for psychological stress (Cummings & DeCotiis, 1973).

Secondly, to make matters more interesting, the phenomenon of stress is believed to involve complex interactions between a person and their environment (Beehr & Newman, 1978). Troxler and Wetzler said harmful stress is "a real or perceived real threat to our physical or psychological self" (1981, p.44). Measuring what is argued to be "real" stress relationships was hard enough without adding in intangible variables of human perception. Selye simplified the concept of stress when he said stress is the body's response to any demand (Beehr & Newman, 1978). Selye said the only time stress is not present is after death (1974). Haakonson, in somewhat the same vein, said "stress is a normal phenomenon. Without it, survival would be impossible" (1980, p.981).

In summary, stress is defined in this thesis to be

the body's response to any real or perceived demand that disrupts the body's state of physiological or psychological balance. While stress is an ever present, important, and most times a positive influence in human lives (Adams, 1980), it can become harmful when it exceeds the body's ability to properly compensate for it.

Causes of Stress

Living in a modern society is stressful. The dynamic life changes are occurring constantly. People experience continual transitions in coping and adjusting with these life changes (Adams, 1980). All life changes require a readjustment, whether the change is positive or negative (Rahe, Romo, Bennett, & Siltanen, 1974). These readjustments or transitions, good or bad, represent a potential unsettling of the person's physical and emotional balance that will produce a strain (Adams, 1980). Mason (1972) said if a stressful life event did not provoke emotion it would produce little or no effect. Severe or prolonged strain will cause stress, which in turn may lead to or aggravate a variety of diseases (Adams, 1980).

The human body has responses it goes through when it is, or perceives to be, in a stressful situation causing what some researchers call a "fight or flight" response. The individual's responses to stress are different for each real or perceived stressor, based on personal experiences, moods, and mental sets (Barrow & Prosen, 1981). Bowers and

Kelly noted the perception of the threat is a common pathway for physical and psychological stressors (1979). Additionally, the perception of threat was found by Richter (1957) to be a strong influence on health. The increased emphasis on perception as the common pathway to the reaction to stress, shifts stress from being just a physiological concept to also being a psychological and behavioral concept (Bowers & Kelly, 1979). Ten other researchers also expressed concern with the potential importance of an individual's perception of a life event on the effect that same event will have on the individual (Byrne & Whyte, 1980).

Troxler and Wetzler describe the process the human body goes through when it is experiencing a stress:

When we experience a stress, our body's physiological and psychological defenses are mobilized to meet it. The result is known as "tension." As the brain perceives a stress, the resulting tension releases adrenocorticotrophic hormone (ACTH), which in turn releases a second hormone, cortisol. The presence of cortisol helps the body fight stress by increasing mental alertness and muscle strength and by pushing up blood pressure and accelerating heart rate. The hormone also plays a vital role in providing emergency energy by breaking down stored sugar and fat and releasing these elements into the blood.

Cortisol is so vital for the resistance of the human organism to stress that when patients do not produce enough of the hormone, surgeons must give it to them the day before their surgery so they can survive the stress of the operation. (1981, p.44)

Therefore, stress is the result of the body's reaction to a disruption of its equilibrium caused by the demand placed on the body by its perceptions of past and

present stresses and/or stressors.

Dysfunctions Associated with Stress

Stress is a natural part of life that is helpful and sometimes needed to respond to emergency situations. Exposure to stress levels that are too high or are experienced too long may result in dysfunctions including physical illness (Adams, 1980; Barrow & Prosen, 1981). The idea of stress-related illness is not new (Graham & Reeder, 1972). "Many physicians have stated that at least 70 percent of the ailments they treat are stress related" (Adams, 1980). Adams also noted (1980) that physical and personality differences affect the body's eventual reactions to stress, and that:

All types of stress...trigger the same physiological response involving the autonomic nervous system and the endocrine-gland system (especially the pituitary, thyroid, and adrenal glands). Under normal circumstances, these systems work to maintain our bodily processes (heart rate, blood pressure, metabolism, and so on) in a physiological equilibrium. When we experience stress, the equilibrium is disrupted because these systems start equipping our bodies to either fight or take flight from the stressors we encounter. Fighting and/or running away were appropriate responses to most stressors experienced by prehistoric humans, but they are seldom appropriate for us today. Because we in modern society have no complete outlet for our stress responses, eventually we experience undesirable manifestations of strain, such as hypertension, increased smoking or drinking, irritability, depression, sleep problems, and so on. Living with these evidences of strain over a prolonged period lowers our resistance to illness and decreases our morale and our effectiveness at work. (p.1-2)

Society has made it less necessary for us to fight or flee with any great frequency, but our bodies have not evolved as fast as has society, and the disruptions

of everyday living still set off the stress response cycle once needed for survival. (p.11)

Stress is dysfunctional (Brown & Harris, 1978; Buck, 1972; Graham & Reeder, 1972; House & Rizzo, 1972; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; King, 1972; Levenson, Hirschfeld, Hirschfeld, & Dzubay, 1983; Levi, 1971; Levine & Scotch, 1970; Rahe & Romo, 1974; Sales, 1970; Selye, 1974; Theorell & Rahe, 1974; Williams & Deffenbacher, 1983). Allen et al. supported these researchers' findings with the results of their own study (1982), where the dominant type of stress found was dysfunctional in nature (1982). Additionally, Allen, McBee, and Justice (1981) found stress (or stressor events), as measured by Holmes and Rahe's Social Readjustment Rating Scale, is also linked to emotional dysfunctioning.

Selye once said, "stress plays some role in the development of every disease" (1974, p.47). Haakonson (1980) modified Selye's General Adaptation Syndrome into a disease model of an individual, to explain the stress-illness relationship. Haakonson defined stress as a "force or pressure acting on a person to compel him to act" (1980, p.981). He continued by saying if the action of the person fails to remove the stress, the model progresses to a "stage of distress, which is defined as a stage when the stress is so severe or so long that the person has difficulty acting appropriately" (1980, p.981). Whether the person is in stress or distress, relief from the condition

is sought. "If the action to achieve ease is ineffective, the result is a breakdown in function and a state of disease" (Haakonson, 1980, p.981).

There is an extensive amount of research and literature linking life change and stress with a variety of illness (Fontana, Hughes, Marcus, & Dowds, 1979; Garrity, Marx, & Somes, 1978 ; Stuart & Brown, 1981). Women, as well as men, experience illness due to stress (Stewart & Salt, 1981; Williams & Deffenbacher, 1983). Stress still produces the primitive fight-or-flight response in people. People who do not have a sufficient way to relieve their stress may be enduring increasing levels of stress which may lead to dysfunctions such as illness and disease.

Research on the stress-disease mechanisms have found "asthma, rheumatoid arthritis, ulcerative colitis, and cancer...involve immunological factors that were unsuspected 25 years ago" (Bowers & Kelly, 1979, p.492). Barrow and Prosen (1981) found physical outcomes such as heart disease, stroke, liver and kidney failure, stomach ulcers, colitis as well as the development of thyroid malfunction, rheumatoid arthritis and asthma are directly related to excessive levels of stress. In addition, they state that sustained stress can deplete the body's resistance level to disease in general (Barrow & Prosen, 1981). Stress responses can also cause migraine headaches, duodenal ulcers, hypertension, and various cardiac difficulties (Bowers & Kelly, 1979). Other

dysfunctions associated with stress include hay fever, peptic ulcer, mental illness, and coronary disease (Shuval, 1981), as well as tuberculosis, fractures, and traffic accidents (Smith, Cullison, Polis, & Holmes, 1978), alcoholism, suicide, and drug abuse (Levine & Scotch, 1970), and upper respiratory illness, mononucleosis, negative physical reactions to menopause, urethral syndrome (irritable bladder), toxemia during pregnancy, premature delivery, as well as vaginal yeast infections (Williams & Deffenbacher, 1983).

Studies have shown that cumulative life change units, and/or the person's perception of a stressor (positive or negative impact, and level of significance associated with the stressful life event) are related to the outcome of the stress reaction.

The effect separate stresses have on a person is a combined effect of the stresses already affecting the person added to current stresses as they are experienced (Troxler & Wetzler, 1981). Haakonson believes this cumulative effect of combined stresses affects a person's ability to perform (1980). Additionally, Rahe, Bennett, Romo, Siltanen, and Arthur (1973), and Rahe et al. (1974) have reported that significant life changes have an impact on longevity. Specifically, their research (Rahe et al., 1973; 1974) documented and supported other researchers who found an increase in life change units accumulated by their subjects

during the six months preceeding occurrences of documented myocardial infarctions and sudden death (Rahe & Lind, 1971; Rahe & Romo, 1974; Theorell & Rahe, 1974). Furthermore, Holmes and Rahe (1967) have shown that people experiencing many stressful life events in a short amount of time stand a greater chance to become ill (Mullen & Suls, 1982). The probable cause of this greater risk of illness is the total effect stressful life events have on the sensitive balance of the endocrine, immune, and autonomic nervous systems of the body (Mullen & Suls, 1982).

The subjective estimates of the significance of recent life changes probably represent a "person's perception of the intensity of a life change event as well as some approximation of the success of one's defenses and coping in dealing with the event" (Rahe, Ryman, & Ward, 1980, p.26). Haakonson predicted that the magnitude of the life change is directly associated to the risk of an accident (1980). Furthermore, highly stressful events were observed to have a negative effect on social and psychological functioning (Justice, McBee, & Allen, 1977). This relationship with psychological functioning was confirmed through four studies that reported with few exceptions that negative life events were strongly related to psychological status (Mueller, Edwards, & Yarvis, 1977). Mueller et al. said the relationship between stressful life events and psychiatric symptoms is well established (1977).

Murphy and Brown (1980) believe stressful life events may cause psychiatric disturbances, they also believe these disturbances in turn lead to the onset of organic illness. Murphy and Brown have found the "link between severe event and organic illness rarely extended, if ever, beyond six months" (1980, p.334).

Studies by Dohrewend (1973) and Holmes and Masuda (1974) suggest there is no difference between the effects of desirable (positive) and undesirable (negative) life events (Monroe, 1982). More recently, Brown and Harris (1978), Mueller et al. (1977), Sarason, Johnson, and Seigel (1978) suggested negative events are primarily associated with psychological symptoms of illness. Monroe's research (1982) also supported the position that negative events, instead of life changes, are helpful in the prediction of the start of psychological symptoms. Liao supports the concept of life changes as psychological stressors that relate to the cause of many illnesses. The research indicated that perceptions of a life change or stressful life event is an important consideration in stress research. A person's perception of, or reaction to, a life event will also bear on (or modify) their organism's reaction to the stress of the event (Kahn et al., 1964). This was supported by Harris and Landreth:

Holding life stress constant, those individuals who interpret their environment as threatening...appear to suffer more serious ill health than those who interpret their environment as benign. (1981, p.32)

Further support for the concept that perceptions can modify stress outcomes, comes from Mullen and Suls who mention nine researchers who indicate negative and uncontrollable life changes are indeed highly stressful and lead to illness (1982). Likewise, Reiser (1975) found negative events such as perceived threats produce stress responses that are thought to cause an imbalance in the body's defensive structure, causing an increase in the risk of disease (Bowers & Kelly, 1979).

Stress research has identified stress responses that correlate to various dysfunctions. These studies have related cumulative life change units, and/or the person's perception of a stressor to the outcome of the stress reaction. Stress research has also found specific relationships between stress and the onset of coronary heart disease.

Coronary Heart Disease

Coronary heart disease (CHD) has also been called coronary artery disease, arteriosclerosis, or ischemic heart disease. The disorders associated with CHD include myocardial infarction, angina pectoris, and sudden death, all of which are the result of arteries damaged by atherosclerosis. (Goldband, Katkin, & Morell, 1979)

Causes of CHD

The stress of life was associated with coronary

heart disease as early as 1892, by Sir William Osler in his work The Principles and Practices of Medicine (Frank, Heller, Kornfield, Sporn, & Weiss, 1978). "Only recently have social scientists engaged in more basic research on 'stress' begun to articulate what constitutes the study of stress in relation to heart disease" (House, 1974, p.12). During the last twenty years many fields of research (sociology, epidemiology, physiology) have developed a number of approaches to study stress and disease. A large portion of this research has concentrated on coronary heart disease (Horan & Gray, 1974).

Lown, Desilva, Reich, & Murawski cited eight studies that suggest certain life styles and stressful life events may predict myocardial infarction and sudden death (1980). Relationships were found between stress and sudden cardiac death (Rahe & Lind, 1971), and between stress and myocardial infarction (Sarason et al., 1978). Sarason and Johnson (1979) found studies that reported life stress is related to myocardial infarction and sudden cardiac death.

Patients with coronary heart disease apparently are characterized by exposure to stressful life events just before the onset of illness (Byrne, 1980; Greene, Goldstein, & Moss, 1972; Rahe & Romo, 1974; Theorell, 1974; Theorell & Rahe, 1974). Byrne and Whyte believe people who had a myocardial infarction (MI) interpreted their life events as more intense than those who did not experience a MI (1980).

Other researchers suggested that the sense of the inability to control outcomes can bring on coronary heart disease and sudden death (Greene, Goldstein, & Moss, 1972; Richter, 1957; Stern, McCants, & Pettine, 1982).

According to Maffet and DeHart, the "basic mechanisms leading to the development of CHD are not fully understood" (United States Air Force, 1981, p.4). Lown et al. said psychophysical factors cannot be ignored if the triggering mechanisms for the ventricular arrhythmias are to be understood (1980). Byrne and Whyte said "it is generally assumed that life events influence the onset of MI by means of their emotionally arousing influence on the individual" (1980, p.1). Coronary infarction is believed to be the result of accumulated stress (Maschewsky, 1982).

Consistently, Rahe and his associates found exposure to the stressful life events prior to coronary heart disease (CHD) increased during the six months preceeding the onset of CHD. The level of life changes during the six months before CHD was higher than the same time of the previous year. The spouses of the sudden death patients reported the victims also experienced same increasing trend during the six months before their deaths. Patients with already high level of life changes due to recent illnesses still experienced an increasing of their total life change units just before the onset of the coronary disease. Their findings have been verified in Finland, Helsinki, as well as

in the United States. (Rahe, 1976; Rahe, 1979a; Rahe et al., 1973; 1974; Rahe, Hervig, Romo, Siltanen, Punsar, Karvonen, & Rissanen, 1978; Rahe & Romo, 1974; Theorell & Rahe, 1974; 1975)

Indicators of CHD

Fye and Staton (1981) used three components of blood chemistry as indicators of stress and predictors of the potential for coronary heart disease: cholesterol, high density lipoprotein (HDL) cholesterol, and cortisol. The USAF Surgeon General's Coronary Artery Risk Evaluation (CARE) Package also identifies three physical indicators -- cholesterol, HDL cholesterol, ratio of total cholesterol to HDL cholesterol -- that can be used to identify people at risk of coronary heart disease. All of these physiological measures can be observed through blood sample analysis. The level of total cholesterol is directly proportionate with CHD risk. Unlike cholesterol, HDL cholesterol reduces CHD risk; that means a high HDL cholesterol level reduces CHD risk, and a low HDL cholesterol increases CHD risk. The ratio of total cholesterol to HDL cholesterol is correlated with an increased risk for subclinical CHD. (United States Air Force, 1981)

Research supports the use of cholesterol as an indicator of CHD risk (Epstein, 1965). Elevated serum cholesterol is a significant risk factor associated with increased risk of CHD (DeHart, 1980). Kozarevic, McGee,

Vojvodic, Gordon, Racic, Zukel, & Dawber (1981) found serum cholesterol is directly related to the risk of CHD and the incidence of CHD death. Patients with CHD are frequently found having high cholesterol levels (Sloane, Habib, Eveson, & Payne, 1961). Frank et al. (1978) saw the physical risk factor of cholesterol had a significant correlation with disease severity. Cholesterol had the strongest correlation; the other factors -- sex, age, smoking, hypertension, and type A behavior -- were also significantly correlated, but had lower and roughly equivalent correlations (Frank et al., 1978). In stress research, twenty-two researchers in eight research teams found "significant increases in the serum concentration of lipids and cholesterol" correlated with stressful life events (Wolf, McCabe, Yamamoto, Adsett, & Schottstaedt, 1962, p.379). Trevisan, Tsong, Stamler, Tokich, Mojonner, Hall, Cooper, and Moss (1983), as well as Wolf et al. (1962) also reported seeing impressive changes in serum cholesterol levels in relation with stressful life events. In most cases, researchers have found increases in serum cholesterol concentration during or after stress (Friedman, Rosenman, & Carroll, 1958; Peterson, Keith, & Wilcox, 1962). Peterson et al. also found increased concentrations of serum cholesterol may occur in anticipation of a stressful event.

While the association between total serum cholesterol and CHD remains valid, HDL cholesterol appears

to be more important in its link with coronary atherosclerosis (Rahe, 1979b). High levels of HDL cholesterol appear to "protect against coronary atherosclerosis" (Rahe, 1979b, p.3). "Concentration of high density lipoprotein (HDL) cholesterol is a sensitive index of coronary heart disease (CHD) risk" (Nestel & Zimmet, 1981, p.257). Nestel and Zimmet cited two studies that reported an independent inverse correlation between HDL cholesterol and CHD, and an additional study that states HDL cholesterol concentration is "currently the most sensitive lipid index of future clinical CHD in middle-aged and older individuals" (1981, p.258). HDL cholesterol appears to have a protective effect against CHD (Swanson, Pierpont, & Adicoff, 1981).

The ratio of total cholesterol to HDL cholesterol has been suggested as an improved measure of coronary heart disease risk (Swanson et al., 1981). Troxler told Fye and Staton that the ratio cholesterol indicator is strongly related to the risk of CHD (Fye & Staton, 1981). Through further study, Swanson et al. found the ratio correlated to the presence, not the severity, of CHD (1981).

Cortisol (hydrocortisone) can also be found through blood analysis and has been used as an indicator of CHD risk. Cortisol is responsive to psychological stress (Mason, 1972; Troxler, Sprague, Albanese, Fuchs, & Thompson, 1977); and stimulates cholesterol production by increasing

the amount of acetyl-CoA in the body (Troxler & Wetzler, 1981). "Evidence indicates that the normal adrenocortical response to increasing degrees of stress is the increased rate of secretion of cortisol" (Woodman, Hinton, & O'Neill, 1978). Knight, Atkins, Eagle, Evans, Finkelstein, Fukushima, Katz, & Weiner (1979) found an inverse relationship between coping with stress and the rate of cortisol production. This finding by Knight et al. is similar to two other studies cited in their report (Katz et al., 1970; Wolff, Hofer, & Mason, 1964).

There is no longer room for reasonable doubt... that psychological stimuli are capable of influencing the level of pituitary-adrenal cortical activity. Marked individual differences in pituitary-adrenal cortical responses to any situation have been a striking and consistent feature of psychoendocrine studies. (Mason, 1968, p.595-596)

Purpose of Research

This research effort was a continuation of the research conducted by Bunner (1982). Statistical analyses was performed on the stress data gathered by the Life Events Survey (LES) described in Bunner (1982), in addition to the background and demographic data gathered through the Stress Assessment Package (SAP-2), and blood tests from the same sample population. The focus of the research was on the correlation (and not causality) of stressful life event variables with three physiological predictors of potential for coronary heart disease and a measure of physiological

stress.

House (1974, p.22) noted that "As populations studied in research on heart disease increase in variety, evidence is emerging that stresses which relate to heart disease or its risk factors in some groups may not do so in others." Therefore this research effort used the same sample population of DOD employees, as did Bunner (1982), for purposes of obtaining information about relationships that may effect DOD personnel.

The Life Events Survey described by Bunner (1982) was developed to identify stressful life events pertinent to DOD employees. In addition to the frequency of stressful life events, the survey also collected data concerning the employee's perception of the event (positive/negative), and perceived significance of the stress (1 = insignificant through 7 = very significant). Further detailed discussion of the Life Event Survey can be found in Bunner (1982).

Research Objective and Questions

"There is little consensus regarding the particular dimensions of events that determine their stressfulness" (Fontana et al., 1979, p.906). Hinkel (1974), Kobasa (1979), and Mullen and Suls (1982) have observed that significant life events, by themselves, do not lead to illness for everyone. Rahe suggests recent life changes are not strong enough to effect the onset of illness (1979b). The effect the life changes do have is influenced by the

individual's perceptions of the life changes (Rahe, 1979b). Byrne and Whyte emphasize the importance of letting people express their perceptions of the impact of recent life events (1980).

This research examined the possible relationships of stressful life event (SLE) variables with three physiological predictors of potential coronary heart disease and a measure of physiological stress. The physiological predictors of the potential for CHD, measured through blood analysis, include total cholesterol, high density lipoprotein (HDL) cholesterol, and the ratio of total cholesterol to HDL cholesterol. The blood analysis also yielded a measure of physiological stress, cortisol.

The individual data entries for the LES included the four SLE variables that were used for this thesis research -- SLE occurrence, frequency of occurrence, perception of the SLE, significance of the SLE. SLE occurrence is a dichotomous variable that signifies whether the SLE occurred to the participant or not. The frequency of occurrence is a value from 0 to 99 indicating how often each of the SLEs occurred to the participant during the last two years (major events), or the last two weeks (minor events). The frequency of the continuous events was not asked for or recorded by the LES, since those events are occurring continuously. The perception of the SLE is a dichotomous variable that indicates whether the participant considered the SLE as

being a positive or negative experience. The significance of the SLE is a seven-point interval scaled variable that represents the significance the participant placed on the SLE -- 1 (insignificant) through 7 (very significant).

Specifically, this research focused on the following questions:

1. How does the SLE occurrence, frequency of occurrence, perception of the SLE (positive/negative), and the perceived significance of the SLE relate to the concentration of total cholesterol?
2. How does the SLE occurrence, frequency of occurrence, perception of the SLE (positive/negative), and the perceived significance of the SLE relate to the level of HDL cholesterol?
3. How does the SLE occurrence, frequency of occurrence, perception of the SLE (positive/negative), and the perceived significance of the SLE relate to the ratio of total cholesterol to HDL cholesterol?
4. How does the SLE occurrence, frequency of occurrence, perception of the SLE (positive/negative), and the perceived significance of the SLE relate to the level of cortisol?

This research also examined the possible relationships of the perception of the SLE (positive/negative) with the same three physiological predictors of potential for coronary heart disease and

measure of physiological stress. Specifically, this part of the research concentrated on the following questions:

5. How does the positive versus the negative perception of a stressful life event relate to the concentration of total cholesterol?

6. How does the positive versus the negative perception of a stressful life event relate to the level of HDL cholesterol?

7. How does the positive versus the negative perception of a stressful life event relate to the ratio of total cholesterol to HDL cholesterol?

8. How does the positive versus the negative perception of a stressful life event relate to the level of cortisol?

Summary

This literature review provided a general background of the subject areas addressed in this thesis and an understanding of what this research effort attempted to find. The first section of the review covered a conceptual definition of "stress," some concepts of the causes of stress, and a look at dysfunctions associated with stress. Next, the review concentrated on coronary heart disease (CHD), what CHD is, what are some of the causes leading to the onset of CHD, and three physiological predictors of potential for CHD and a measure of physiological stress used

by researchers and medical doctors, alike, to predict the onset or risk of onset of CHD in people. Finally, this review briefly reviewed the Life Events Survey (Bunner, 1982), then presented the specific questions this research endeavored to answer.

CHAPTER 3

METHODOLOGY

The purpose of this research was to take the thesis research conducted by Bunner (1982) beyond its conclusion by conducting statistical analyses of the data gathered by the Life Events Survey (LES) described by Bunner (1982), the background and demographic section of the Stress Assessment Package, Version 2 (SAP-2), and blood tests from the same sample population. This research was directed toward finding the correlation (and not causality) of stressful life event (SLE) variables -- including SLE occurrence, frequency of occurrence, perceived impact (positive or negative) of a SLE on the participant, and perceived significance of the SLE -- with predictors of potential for coronary heart disease (cholesterol, HDL cholesterol, ratio of the total cholesterol to HDL cholesterol) and a measure of physiological stress (cortisol).

Sample Population

The research sample of DOD employees was drawn from the DOD participants present at stress seminars given by the Organizational Sciences Department of the Air Force Institute of Technology, AFIT/LSB. According to the AFIT/LSB

data on file the SAP-2 questionnaire was administered to 443 of the seminar participants; only 369 of the participants volunteered to give blood samples; and ninety-three participants completed the LES. Of all of the participants, only seventy-six participants completed all three -- took the SAP-2, the LES, and gave blood samples. The demographic characteristics profile of the sample was generated by using the FREQUENCIES subprogram of the Statistical Package for the Social Sciences (SPSS), Second Edition (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975).

The 76 cases were drawn from a sample population of seminar participants at the following locations:

- Brooks AFB, TX
- Champus, Denver, CO
- Langley AFB, VA
- Metropolitan Hospital, San Antonio, TX
- Randolph AFB, TX
- Wilford Hall, Dental Dept, Lackland AFB, TX
- Wright-Patterson AFB, OH

The ages of the participant sample ranged from 26 to 61, with the average age being 39.054 (two people did not answer). Seventy percent of the sampled participants were male and thirty percent, female. The sample contained seventy-three Caucasians (96 percent) and three Hispanics (4 percent). No other ethnic group was represented in this sample. Twenty-four percent of the participants (18) were supervisors, seventy-six percent (58) were not.

Of the seventy-six participants, 5 were high school graduates or equivalent, 28 had some college education

without completing a Bachelor's degree, 7 earned Bachelor's degrees, 12 went on to complete some graduate work, 14 received Master's degrees, 9 held Doctorate degrees, and one case did not specify.

Three people (4 percent) from the sampled participants had been previously diagnosed as having coronary heart or artery disease. The total cholesterol levels of the sample ranged from 131 to 332, with a mean of 214.553. HDL cholesterol levels ranged from 24 to 86; the average was 51.895. Cortisol levels (with seven missing cases) were seen as low as 3.96, as high as 42.99, and averaged 12.039. A summary of these and more demographics characteristics of this sample can be found in Appendix A.

Data Collection

The Stress Assessment Package (SAP) was developed by the AFIT faculty and is described in Fye and Staton (1981). The SAP was later modified and this second version (SAP-2) is described in Martin and Simard (1982). The SAP-2 (Appendix B) was designed to measure personal stress level and other factors thought to relate to stress and coronary heart disease.

The SAP-2 contains 160 questions divided into the 13 sections:

Section Title	Number of Questions
Personal Beliefs (Locus of Control)	14
Personal Attributes	15
Perceived Productivity	4
Job Inventory	30
Supervisor Inventory	15
Organizational Climate Inventory	17
Job Satisfaction	7
Assertiveness Inventory	5
Social Environment Inventory	8
Perceived Stress	10
Family Inventory	5
Food Consumption Inventory	5
Background and Demographic Information	25

Further detailed discussion on the development, design, and uses of the SAP and SAP-2 can be found in Fye and Staton (1981) and Martin and Simard (1982).

The Life Events Survey (LES) is described in Bunner (1982). It was designed to identify stressful life events pertinent to Department of Defense (DOD) employees. The survey divides stressful life events (SLE) into three categories -- major, minor, and continuous. The LES (Appendix C) lists 58 major, 10 minor, and 15 continuous life events. The participants were asked to respond to each life event that has happened or is happening to them. The responses include the individual's perception of the life event (positive or negative) and the frequency of the events (except for the continuous category). Appendix D shows a summary of the stressful life events, perceptions of the stress, and extent of perceived stress experienced by the sample population used for this research. The LES data

contained some incorrect entries that are noted in Appendix D. These incorrect entries are discussed further in the Data Reliability section of this chapter. Additional information on the LES can be found in Bunner (1982).

The blood sample analysis was conducted by the USAF School of Aerospace Medicine, Brooks AFB, Texas to determine the levels of total cholesterol, HDL cholesterol, and cortisol in each of the samples. Detailed discussion of the blood work analysis can be found in Martin and Simard (1982).

Data Reliability

This research was based upon the data collected by the LES, the background and demographic information section of the SAP-2, and the blood tests.

The LES data contained 15 incorrect entries for SLE perception. Instead of these data points being coded 1 (negative) or 2 (positive), they were 0. In addition, 9 entries for the extent of perceived stress were entered as 0 instead of a value between 1 and 7. Since values of 0 would not affect the transformation of separate SLE experience variables to summary values of the new total data file (discussed later in the Data Manipulation section of this thesis), the cases that contained the incorrect data were kept and used to minimize losing the good data associated with those cases. However, these same cases with incorrect

data entries for SLE perception were not included when segregating the SLE summary data into positive SLE and negative SLE data files. The incorrect data cases were not included since it was not known if the perception was meant to be neutral (not of interest in this study), or if it was not meant to be neutral what the perception response was supposed to be.

According to Martin and Simard (1982) the blood tests were done at one facility (USAF School of Aerospace Medicine, Brooks AFB, Texas) to ensure consistent standards were practiced. The USAF School of Aerospace Medicine (USAFSAM/NPG) used the lipid standards of the National Bureau of Standards and the Center for Communicable Diseases for standardization. The blood samples were analyzed for total cholesterol, HDL cholesterol, and cortisol. The plasma cholesterol was analyzed using the enzymatic method and BMC autoflo cholesterol reagents (catalog number 14893, biodynamics/bmc, Indianapolis, IN 46250) and ABA-100 biochromatic analyzer (Abbot Laboratories, North Chicago, IL 60064). The between-day coefficient of variations were kept at 2.5 percent or less. HDL cholesterol was analyzed either by the enzymatic method just described or by checking the serum floating on top after phosphotungstic acid precipitation with the coefficient of variations kept at 1.0 percent or less. The cortisol was analyzed using the Gamma Coat Cortisol RIA technique (Clinical Assays catalog number

CA-529 and CA-549, Cambridge, MA 02139).

Data Manipulation

This research examined the possible relationships of four stressful life event variables with three physiological predictors of the potential for coronary heart disease and a measure of physiological stress.

LES Data

The data file from the LES included the values of the individual SLE variables -- SLE occurrence, perception of the SLE (positive/negative), frequency of occurrence (except for continuous events), and the significance of the SLE -- for each SLE experienced by a participant.

SLE occurrence was a dichotomous variable that signified whether the SLE occurred to the participant (1) or not (0). The perception of the SLE was a dichotomous variable that indicated whether the participant considered the SLE as being a positive (2) or negative (1) experience. The frequency of occurrence was a value from 0 to 99 that indicated how often each of the SLEs occurred to the participant during the last two years (major events), or the last two weeks (minor events). The frequency of the continuous events was not asked for or recorded by the LES, since those events were assumed to occur continuously. The significance of the SLE was a seven-point ordinal scaled variable that represented the extent the participant felt

the SLE was stressful -- 1 (insignificant) through 7 (very significant).

Transformed Data

The original data file (containing separate SLE variables for each SLE experienced) was transformed by summing the separate variables into a data file that represented the total SLE experience of each participant (or case) by type of the stressful life events -- major, minor, and continuous. This transformation was done to maintain the integrity of the data since the relationships among major, minor, and continuous SLEs were not fully understood.

The summary SLE variables included a measure of how many separate major, minor, and continuous SLEs occurred to each participant (occurrence), the total individual perception of the events (perception), the accumulated measure of the frequencies of events that occurred to each participant (frequency -- except continuous SLEs, whose frequencies were assumed to be constant), and the summed measure of the extent of perceived stress of the SLEs that occurred to an individual (significance).

The variable "occurrence" was computed by a simple count of how many of the different major, minor, and continuous SLEs occurred to each participant. If ten different SLEs occurred to a participant, the value of the variable "occurrence" for that case would be 10.

The value for "perception" was calculated by adding +1 for every type of SLE experienced that the participant thought was positive and adding -1 for every type of SLE experienced that the participant thought was negative. This was done by recoding the LES values of a positive experience (from 2 to 1) and a negative experience (1 to -1) to allow summing the separate perceptions without weighing one greater than the other. Therefore, if the same participant experienced ten different stressful life events -- six positive and four negative -- the value of "perception" would be 2 (+6-4).

"Frequency" measured the total number of SLE experienced by a participant. If ten different SLEs happened twice (such as two changes in careers, or two vacations) to the same participant, the "frequency" value would be 20.

The extent each different SLE was stressful to the participant was recorded by the variable "significance." "Significance" was calculated by summing the values (1 to 7) of each of the different SLEs. Therefore, if four of the ten SLEs were moderate (4) and the remaining six SLEs were very significant (7), the value of "significance" would be 58 $((4 \times 4) + (6 \times 7))$.

The predictors of the potential for CHD -- total cholesterol, HDL cholesterol, ratio of total cholesterol to HDL cholesterol -- and the measure of physiological stress

-- cortisol -- were the same values measured through blood analysis. The blood analysis yielded 76 cases with values for total cholesterol, HDL cholesterol, and ratio of total cholesterol to HDL cholesterol, and 69 cases with cortisol values.

Once the data was transformed into a summary data file (by case) for all stressful life events (positive and negative) two additional data files were generated segregating the positive and the negative events for subsequent analysis, resulting in the formation of three new data files containing just the data needed for this research.

Data Analyses

The types of statistical tests used during this research include (1) SPSS FREQUENCIES to generate a demographic profile of the research sample; (2) SPSS PEARSON CORR for a preliminary check of the possible linear relationships between the dependent and independent variables of interest; and (3) SPSS REGRESSION multiple regression procedure to examine the predictive relationships between the summary stressful life event variables (taken from the each of the three new data files) and the three physiological predictors of potential for CHD as well as the measure of physiological stress.

Summary

In summary, this research was directed toward finding the correlation (and not causality) of stressful life event (SLE) variables -- including the occurrence of a SLE, frequency of occurrence, perceived impact (positive or negative) of the SLE on the participant, and perceived significance of the stress (measured by the seven-point scale in the LES) -- on physiological predictors of potential for coronary heart disease (cholesterol, HDL cholesterol, ratio of the total cholesterol to HDL cholesterol) and the measure of physiological stress (cortisol).

CHAPTER 4

ANALYSIS AND RESULTS

The purpose of this chapter is to discuss the data analysis conducted during this research. This chapter contains the statistical analyses used to answer the research questions posed in Chapter 2. Each research question from Chapter 2 is answered in this chapter and the results are presented in turn. The research questions had to do with the possible relationships between the variables shown below:

Independent Variables

Major SLE Occurance
Major SLE Perception
Major SLE Frequency
Major SLE Significance
Minor SLE Occurance
Minor SLE Perception
Minor SLE Frequency
Minor SLE Significance
Continuous SLE Occurance
Continuous SLE Perception
Continuous SLE Significance

Dependent Variables

Total Cholesterol
HDL Cholesterol
Ratio of Total Cholesterol/HDL
Cortisol

The first set of four research questions were answered by the analysis of the total SLE population from the transformed data file containing the variables just listed.

The variables used in the analysis of the second set of research questions used the same variables used for the

first set with the exception of the variables for SLE perceptions (positive/negative). The values for those perceptions (if they had been used) would have been the same as the values as the occurrences, and would have resulted in the same influence on the dependent variable (see Appendix E where the perception variables were included in the Pearson correlation). Furthermore, since the perception and occurrence variables would have the same effect on the dependent variables they would have presented a problem of multicollinearity if the perception variables were included in the regressions. Since the data were already separated by positive and negative perceptions, results comparing the effects of the perceptions on the dependent variables were still achievable by comparing the relationships of the SLE variables from the two data files with the dependent variables .

Throughout this analysis an alpha value of 0.05 (a 95 percent confidence interval) was used. The data were first analyzed by Pearson product-moment correlations then by multiple regression. Both the Pearson correlations and the multiple regressions were run with pairwise deletion of cases with missing data values. Pairwise deletion was used to keep as many valid values of the cases in the calculations as possible. Stepwise regression was used in the multiple regression in an attempt to get an optimal prediction model with as few variables possible. Only the

variable explaining the greatest amount of variance, by itself (for the first step) and in conjunction with the other variable(s) already in the model, will enter the model on each successive step of the regression procedure. Summary tables showing the results from the Pearson correlations and multiple regressions are in Appendices E and F respectively.

Research Question 1

How does the SLE occurrence, frequency of occurrence, perception of the SLE (positive/negative), and the perceived significance of the SLE relate to the concentration of total cholesterol?

The Pearson correlation showed both the occurrence and significance of major stressful life events (individually) had the highest correlations and were significantly related to total cholesterol. Interestingly, the occurrence and significance of the major SLEs are shown to be negatively correlated with the level of total cholesterol.

While multiple regression did not produce a significant model ($p > 0.05$), the regression (like the Pearson correlation) ranked the occurrence of major SLEs as its most significant variable ($p < 0.1$) in a possible relationship with total cholesterol.

Research Question 2

How does the SLE occurrence, frequency of occurrence, perception of the SLE (positive/negative), and the perceived significance of the SLE relate to the level of HDL cholesterol?

The Pearson correlation revealed no variables were significantly related to HDL cholesterol. The best correlation found from this attempt had a significance of 0.245.

Again, results from the multiple regression did not show any significant models for a relationship with HDL cholesterol. The best individual variable's significance was 0.303.

Research Question 3

How does the SLE occurrence, frequency of occurrence, perception of the SLE (positive/negative), and the perceived significance of the SLE relate to the ratio of total cholesterol to HDL cholesterol?

Again, no significant individual relationships were found by the Pearson correlation. The best correlation (although still insignificant) was a minus 0.1538.

The multiple regression indicated no significant relationships with the ratio of the cholesterols. The best significance level from the regression was 0.207.

Research Question 4

How does the SLE occurrence, frequency of occurrence, perception of the SLE (positive/negative), and the perceived significance of the SLE relate to the level of cortisol?

The Pearson correlation indicates the frequency of major stressful life events relates very significantly with cortisol. The significance of the occurrence variable for major SLEs is 0.002.

Ten out of the eleven SLE summary variables entered the multiple regression model with an overall model significance of 0.027. The only variable that did not enter this model was the perception of major SLEs.

Research Question 5

How does the positive versus the negative perception of a stressful life event relate to the concentration of total cholesterol?

The Pearson correlations of both the positive and negative SLE data files resulted in only one significant variable, the significance of positive, continuous stressful life events ($p = 0.034$). No other variable (positive or negative data file) was seen to have a significant relationship with total cholesterol.

While the significance of positive, continuous SLEs was the most significant variable in either multiple regression, its significance was 0.084. No models resulted

from these multiple regressions.

Research Question 6

How does the positive versus the negative perception of a stressful life event relate to the level of HDL cholesterol?

Neither the positive nor the negative data file resulted in a significant Pearson correlation between the SLE variables and HDL cholesterol.

The multiple regressions once again confirmed the doubts offered by the Pearson correlation results. The best significance levels resulting from the regressions were 0.229 (negative SLEs) and 0.710 (positive SLEs). No models were produced from these regressions.

Research Question 7

How does the positive versus the negative perception of a stressful life event relate to the ratio of total cholesterol to HDL cholesterol?

The Pearson correlation results did not contain any indications of significant relationships between the SLE variables and the ratio of total cholesterol to HDL cholesterol (for positive or negative SLEs).

Multiple regressions did not produce any significant models for this portion of the research. The significance levels closest to the 0.05 alpha limit were 0.233 (positive)

and 0.249 (negative).

Research Question 8

How does the positive versus the negative perception of a stressful life event relate to the level of cortisol?

The Pearson correlations were successful in reporting significant relationships among three variables and the measure of cortisol. The positive SLE data yielded two significant variables, frequency of major stressful life events (0.037) and significance of continuous stressful life events (0.013). The correlation of the negative SLE data also identified the frequency of major stressful life events as a significant variable (0.002).

Multiple regressions were again successful in finding models for the relationship between SLE variables and the levels of cortisol. The positive SLE data were successful in forming a model with all eight variables used in this portion of the analysis, with a model significance of 0.036, and three variables showing individual significance values less than 0.05. The negative data formed a model with five variables, a model significance value of 0.045, one variable with a significance level less than 0.01, and another variable with a significance level less than 0.10. The variables for minor SLE frequency and continuous SLE significance were not in this model.

Summary

The following is provided as a summary of the analysis described in this chapter:

	Total Cholesterol	HDL Cholesterol	Ratio Total/HDL	Cortisol
<u>Total Data</u>				
Pearson Correlation	Significant	Not Significant	Not Significant	Significant
Multiple Regression	Not Significant	Not Significant	Not Significant	Significant
<u>Pos. Data</u>				
Pearson Correlation	Significant	Not Significant	Not Significant	Significant
Multiple Regression	Not Significant	Not Significant	Not Significant	Significant
<u>Neg. Data</u>				
Pearson Correlation	Not Significant	Not Significant	Not Significant	Significant
Multiple Regression	Not Significant	Not Significant	Not Significant	Significant

The next chapter, Chapter 5, will provide conclusions and recommendations for future research.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Conclusions

This research was directed toward finding the correlation (and not the causality) of stressful life event (SLE) variables -- SLE occurrence, perceived impact (positive or negative) of a SLE on a person, frequency of occurrence, and perceived significance of the SLE -- with predictors of potential for coronary heart disease (cholesterol, HDL cholesterol, ratio of the total cholesterol to HDL cholesterol) and a measure of physiological stress (cortisol).

Significant relationships were found between some of the independent and dependent variables through analysis of the required data from the Stress Assessment Package - 2, Life Events Survey, and results from blood analysis. The analysis from the Pearson correlations found seven significant, individual, linear relationships.

Even though no linear relationships were found between the SLE variables and HDL cholesterol and the ratio of total cholesterol to HDL cholesterol, three unexpected, significantly correlated, linear relationships were found with total cholesterol. The individual linear relationships

were between occurrence of continuous SLEs (from the positive sample of SLEs), occurrence and significance of major life events (from the total sample of SLEs) and total cholesterol. What was so unexpected was that these SLE variables were negatively correlated with total cholesterol.

The anomaly of the negative correlation of the SLE variables with total cholesterol may be due to the fact that the LES data are retrospective in nature. Byrne and Whyte (1980) have said retrospective studies have been criticized for the use of subjective memories that fade with the passing of time. Another criticism is centered around the possibility the person participating in the study may be expressing what Byrne and Whyte (1980, p.7) call "effort after meaning," where someone may explain away an illness through exaggeration of life events. Rabkin and Struening (1976) mentioned selective memory, overreporting to justify an illness, and event denial as sources of error in retrospective studies. These effects can result in negative correlations. Either faded (lower) memory of critical events, or event denial, combined with a high cholesterol level or exaggerated account of past life events (trying to explain away an illness) combined with a lower than expected cholesterol level would result in a negative correlation between SLE variables and total cholesterol.

The most consistent relationship found by this

analysis, by far, is the positive relationship between the frequency of major life events and the level of cortisol. No matter what data file was used the major SLE frequency-cortisol relationship stood strong with significance levels of 0.002 for negative and total events, and 0.037 for the positive SLEs. A more limited relationship was found between the significance of positive, continuous SLEs and the level of cortisol. The relationship was limited in that it only existed for the sample of positive events.

The most significant finding of this research was the persistent significance of relationships between SLE variables and cortisol that was found throughout the analysis of multiple regressions. The relationships were strong and consistent with the earlier research of Mason, (1968); Troxler et al. (1977); Troxler and Wetzler (1981); and Woodman, Hinton, and O'Neill (1978).

Future Research

Cross-sectional analysis of stressful life events only reveals moments or snapshots of the human relationship with stressful life events. Even if the snapshot is significant, it may or may not capture the true relationships or reactions to stress since it is only as good as the moment itself. The many and varied effects of stress may not be immediately visible. Monroe (1982) as

well as Rahe (1976; 1979a) and his colleagues (Rahe et al., 1973; 1974) have noted it may take stress from six to nine months to manifest itself as an illness.

Future research should be directed toward longitudinal studies of SLE data. Studies focusing on the Department of Defense could take advantage of the ready source of growing medical data from the periodic medical physical examinations that are mandatory for many of the active duty military personnel. Studies should be directed toward observing stress, cholesterol, HDL cholesterol, and cortisol during highly stressful duty such as undergraduate pilot or navigator training, combat flight training, and field exercises (war games); or during what is considered to be more routine military events such as Operational Readiness Inspections, Inspector General inspections, entry into active duty service, permanent change of station moves, personnel effectiveness rating cycles, and retirements. The results may help the military manage the stress their people are exposed to and better understand the physiological and psychological effects that stresses can produce.

Final Remarks

Stress is a natural and ever present part of life. Stress can be helpful and sometimes needed to adapt to emergency situations. Certain amounts of stress have been found to be beneficial. But exposure to extreme levels of

stress or to prolonged stress can lead to physical illness, even sudden death. The knowledge base on stress must be expanded if stress is to be fully understood so its effects can be made to serve people, and reduce or eliminate the risk of stress related illnesses and mortality.

APPENDICES

APPENDIX A
DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE POPULATION

Characteristic	Percent
Age	
25-29	14
30-34	22
35-39	22
40-44	14
45-49	16
50-54	5
55-59	4
60-64	2
Did Not Answer (2 Cases)	
Sex	
Male	70
Female	30
Race	
American Indian or Alaska Native	0
Asian or Pacific Islander	0
Black, not of Hispanic Origin	0
Hispanic	4
White, not of Hispanic Origin	96
Other	0
Education	
Non-high School Graduate	0
High School Graduate, or GED	7
Some College Work	37
Bachelor's Degree	9
Some Graduate Work	16
Master's Degree	19
Doctoral Degree	12
Did Not Answer (1 Case)	
Marital Status	
Not Married - No Children	7
Married - Spouse is employed outside home	51
Married - Separated due to employment	0
Married - Separated due to choice	3
Married - Spouse is not employed	26
Married - Spouse is not employed - separated due to employment	0
Divorced - Do not have custody of children	5
Single Parent	8

(Continued)

Characteristic	Percent
Supervisory Status	
Supervisor	24
Non-supervisor	76
Service Status	
Military	
Officer	37
Warrant Officer	0
Enlisted	17
Civil Service	
General Schedule	46
Wage Grade	0
Previously Diagnosed as Having Coronary Heart Disease or Coronary Artery Disease	
Yes	4
No	96

APPENDIX B
STRESS ASSESSMENT PACKAGE (VERSION 2)

SCN 81-115
STRESS ASSESSMENT PACKAGE
(Version 2)

The Stress Assessment Package (SAP) is a tool designed to aid in measuring your personal stress level and determine some of the original components that may contribute to stress.

You will find the terms work group, organization, and supervisor used extensively as you complete this questionnaire. The term work group refers to a group of individuals working for the same supervisor, while the term organization refers to the overall organizational unit. For example, if your position is within a section of a squadron then the squadron is your organization and your section is your work group.

Using the answer sheet provided, please mark your responses with a number 2 pencil only. Make heavy black marks that completely fill the appropriate space.

It is important that you answer all items honestly. This is the only way an accurate stress assessment can be made.

Your individual responses will be held in the strictest confidence, and will not be provided to any organization or persons. Only those directly involved in this research will have access to your completed SAP.

In the information block labeled "your work group code," fill in the appropriate code provided by your survey monitor and blacken the corresponding spaces.

EXAMPLE:
YOUR WORK
GROUP CODE

	1	2	3	4	5
[A]	[A]	[A]	[>]	[>]	[A]
[B]	[B]	[B]	[B]	[B]	[B]

Follow the same procedure for the other blocks as they pertain to you. Fill in yes or no for the supervisor block. If you are a supervisor, fill in your subordinate's work group code, also given by the survey monitor. If you are employed by the Department of Defense, fill in the "Base Unit" code and your Air Force Specialty Code (AFSC).

In block 216, blacken the numbers corresponding to your NORMAL Monday through Friday WAKE-UP TIME using a 24-HOUR CLOCK. For example, you normally get up at 1 p.m. for shift work. Using the 24-hour clock, you would blacken in the numbers for 1300, one number per column.

EXAMPLE:

216			
[0]	[0]		
	[1]	[1]	[1]
[2]	[2]	[2]	[2]
[3]		[3]	[3]

If you are in the military service, or are a civil service employee, use block 217 to fill in your rank corresponding to the code below:

<u>Officers</u>	<u>Civil Service</u>
	<u>GS</u>
0-1 fill in 0-1	GS-1 fill in 4-1
0-2 fill in 0-2, etc.	GS-2 fill in 4-2
	.
<u>Warrent Officer</u>	.
	.
W-1 fill in 2-1	GS-7 fill in 4-7
W-2 fill in 2-2, etc.	SES fill in 4-16
<u>Enlisted</u>	<u>WG</u>
E-1 fill in 3-1	WG-1 fill in 5-1
E-2 fill in 3-2, etc.	WG-2 fill in 5-2
	.
	.
	.
	WG-7 fill in 5-7, etc.

EXAMPLE

217
[0] [0]
[1] [1] [1]
[2] [2] [3]

In block 221, fill in your age by blackening the appropriate numbers. For example, a 32 year old person would used the 3 in the first row and the 2 in the second row.

EXAMPLE

221
[0] [0]
[1] [1]
[2] [3]
[4] [5]

The scales provided next are either 5, 6, or 7-point scasles with an additional space provided for not applicable (NA) responses. For example:

Scale:

NA = Not Applicable	4 = Neither Agree nor Disagree
1 = Strongly Disagree	5 = Slightly Agree
2 = Moderately Disagree	6 = Moderately Agree
3 = Slightly Disagree	7 = Strongly Agree

Item Statement:

1. My supervisor is a good planner.

Answer Response:

D	NA								
		001	1	2	3	4	5	6	[7]

In the example above the individual selected option 7 since he or she strongly agreed with the statement. If the response had been considered to be not applicable, the NA response space would have been filled in.

DO NOT STAPLE OR OTHERWISE DAMAGE THE ANSWER SHEET

PRIVACY STATEMENT

In accordance with paragraph 3, AFR 12-35, the following information is provided as required by the Privacy Act of 1974.

a. Authority

- (1) 5 U.S.C. 301, Departmental Regulations, and/or
- (2) 10 U.S.C. 8012, Secretary of the Air Force, Powers, Duties, Delegation by Compensation, and/or
- (3) DOD Instruction 1100.13, 17 Apr 68, Surveys of Department of Defense Personnel, and/or
- (4) AFR 30-23, 22 Sep 76, Air Force Personnel Survey Program.

b. Principal Purpose. The survey is being conducted to collect information to be used in research aimed at illuminating and providing inputs to the solution of problems of interest to the Air Force and/or DOD.

c. Routine Uses. The survey data will be converted to information for use in research of management related problems. Results of the research, based on the data provided, will be included in written master's theses and may also be included in published articles, reports, or text. Distribution of the results of the research, based on the survey data, whether in written form or presented orally, will be unlimited.

d. Participation in this survey is entirely voluntary.

e. No adverse action of any kind may be taken against any individual who elects not to participate in any or all of this survey.

PERSONAL BELIEFS

Instructions

This portion of the questionnaire relates the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives numbered 1 or 2. Using the scale below, indicate which statement most closely follows your own beliefs and record it on your answer sheet.

- 1 = I strongly agree more with statement 1
- 2 = I moderately agree more with statement 1
- 3 = I slightly agree more with statement 1
- 4 = I slightly agree more with statement 2
- 5 = I moderately agree more with statement 2
- 6 = I strongly agree more with statement 2

1. 1 Usually people get the respect they deserve in this world.
2 An individual's worth often passes unrecognized no matter how hard he/she tries.
2. 1 The idea that teachers are unfair to students is nonsense.
2 Most students don't realize the extent to which their grades are influenced by accidental happenings.
3. 1 Becoming a success is a matter of hard work; luck has little or nothing to do with it.
2 Getting a good job depends mainly on being in the right place at the right time.
4. 1 Most citizens can^{it} have an influence in government decisions.
2 This world is run by the few people in power, and there is not much the little guy can do about it.
5. 1 For me, getting what I want has little or nothing to do with luck.
2 Many times we might just as well decide what to do by flipping a coin.
6. 1 Getting people to do the right thing depends upon ability; luck has little or nothing to do with it.
2 Who gets to be the boss often depends on who was lucky enough to be in the right place first.
7. 1 There is really no such thing as luck.
2 Most people don't realize the extent to which their lives are controlled by accidental happenings.
8. 1 It is impossible for me to believe that chance or luck plays an important role in my life.
2 Many times I feel that I have little influence over the things that happen to me.
9. 1 What happens to me is my own doing.
Sometimes I feel that I don't have enough control over the direction my life is taking.

PART II

Indicate your agreement with the statement below using the following scale:

- | | |
|-------------------------|--------------------------------|
| NA = Not Applicable | 4 = Neither Agree nor Disagree |
| 1 = Strongly Disagree | 5 = Slightly Agree |
| 2 = Moderately Disagree | 6 = Moderately Agree |
| 3 = Slightly Disagree | 7 = Strongly Agree |

10. What happens to me is usually because of my own doing.
11. I frequently feel that in dealing with life situations I might do just as well if I flipped a coin.
12. Generally speaking, there really is no such thing as luck.
13. Without the right breaks one cannot become effective as a manager.
14. Usually, individuals have misfortunes due to their own mistakes.

PERSONAL ATTRIBUTES

Instructions

The next set of questions is concerned with your personal attributes. Each item consists of five alternatives. Select the alternative that is the most descriptive of you as an individual. Please record your answer on the answer sheet.

15.
 - 1 Winning is everything; my satisfaction comes from winning.
 - 2 I like winning any game or event, and am very disappointed when I lose.
 - 3 I like winning any game or event, and am somewhat disappointed when I lose.
 - 4 I like winning any game or event, but I equally enjoy the social interaction and participation.
 - 5 I enjoy the social interaction and participation that comes with a game or event, and losing does not bother me at all.
16.
 - 1 I do my very best when I'm fighting a tight deadline.
 - 2 I seem to do my best work when I have a reasonable deadline to meet.
 - 3 I work equally well whether I have a deadline to meet or not.
 - 4 Although I perform adequately with a deadline to meet, I prefer to not meet a deadline.
 - 5 I do not like deadlines; I do my best work when I'm not hurried in any manner.
17.
 - 1 I hate to wait on anything or anybody.
 - 2 I do not enjoy waiting but I will if I absolutely have to.
 - 3 Although I don't really enjoy waiting, I don't mind it if I don't have to wait too long.
 - 4 I don't mind waiting; there are many situations where one must wait.
 - 5 Waiting on something or someone is a pleasant opportunity to relax.

18. 1 I am always in a rush, even when I don't have to be.
 2 Most of the time I'm in a hurry, even when I don't have to be.
 3 I occasionally find myself in a hurry, even though most of the time I don't have to.
 4 I seldom hurry myself; only when I have to.
 5 I will not hurry myself, even when I know I'm late.
19. 1 I always try to do too much, as a result I always feel tired.
 2 I frequently try to do too much, and as a result I feel tired most of the time.
 3 On rare occasions I find myself trying to do too much; when these occasions arise, I slow down.
 4 I pace myself in accomplishing tasks so that they are all accomplished with the minimum amount of fatigue.
 5 I will not overextend myself, even if it means not getting something done.
20. 1 I set very high work standards for myself, and get very upset when I don't meet them.
 2 I set high work standards for myself, and get upset when I don't meet them.
 3 I set my own work standards, and it bothers me somewhat if I don't meet them.
 4 I set work standards for myself, and it bothers me to a little extent if I don't meet them.
 5 I maintain work standards that I can make without overextending myself, and I do not get upset if I occasionally fail.

PART II

Instructions

Indicate your agreement with the statement by selecting the response option which best represents your attitude concerning your personal attributes.

NA = Not Applicable	4 = Neither Agree nor Disagree
1 = Strongly Disagree	5 = Slightly Agree
2 = Moderately Disagree	6 = Moderately Agree
3 = Slightly Disagree	7 = Strongly Agree

21. I like winning any game or event, and I am very disappointed if I lose.
22. I hate to wait on anything or anybody.
23. I am frequently in a hurry, even when I don't have to be.
24. I frequently get upset and angry with people, but I usually do not show it.
25. I set high work standards for myself, and get upset when I don't meet them.
26. I frequently try to do too much, and as a result I feel tired most of the time.

NA = Not Applicable

1 = Strongly Disagree

2 = Moderately Disagree

3 = Slightly Disagree

4 = Neither Agree nor Disagree

5 = Slightly Agree

6 = Moderately Agree

7 = Strongly Agree

27. I eat fast, because sometimes I feel that I could put the time I spend eating to better use.
28. I frequently get irritated when a person takes too long in making his/her point in a normal conversation.
29. I get agitated when someone is late in meeting with me.

PERCEIVED PRODUCTIVITY

Introduction

The statements below deal with the output of your group. For some jobs certain statements may not be applicable. Should this be the case for your work group, then you should select the not applicable statement coded "NA" below. Indicate your agreement with the statement by selecting the answer which best represents your attitude concerning your work group.

NA = Not Applicable

1 = Strongly Disagree

2 = Moderately Disagree

3 = Slightly Disagree

4 = Neither Agree nor Disagree

5 = Slightly Agree

6 = Moderately Agree

7 = Strongly Agree

30. The quality of output of your work group is very high.
31. When high priority work arises, such as short suspenses, crash programs, and schedule changes, the people in my work group do an outstanding job in handling these situations.
32. Your work group's performance in comparison to similar work groups is very high.
33. The quantity of output of your work group is very high.

JOB INVENTORY

Instructions

Below are items which relate to your job. Read each statement carefully and then decide to what extent the statement is true of your job. Indicate the extent that the statement is true for your job by choosing the statement below which best represents your job.

1 = Not at all
2 = To a very little extent
3 = To a little extent
4 = To a moderate extent

5 = To a fairly large extent
6 = To a great extent
7 = To a very great extent

Select the corresponding number for each question and enter it on the separate answer sheet.

34. To what extent does your job provide a great deal of freedom and independence in scheduling your work and selecting your own procedures to accomplish it?
35. To what extent does your job give you freedom to do your work as you see fit?
36. To what extent do you use your time for weekly or monthly planning?
37. To what extent do you use your time for daily planning?
38. To what extent is your work group involved in establishing goals?
39. To what extent is there conflict between your work group and another work group in your organization?
40. To what extent is there conflict between your organization and another organization with which you have some work-related dealings?
41. To what extent are your job performance goals realistic?
42. To what extent are you proud of your job?
43. To what extent does your job give you a feeling of pride and self-worth?
44. To what extent does doing your job well affect a lot of people?
45. To what extent is your job significant, in that it affects others in some important way?
46. To what extent is your work group involved in establishing goals?
47. To what extent are your job performance goals clear and specific?
48. To what extent do you know exactly what is expected of you in performing your job?
49. To what extent would you like to have the opportunity for personal growth in your job?
50. To what extent would you like to have the opportunity to use your skills in your job?
51. To what extent would you like to have the opportunity to perform a variety of tasks in your job?

1 = Not at all
2 = To a very little extent
3 = To a little extent
4 = To a moderate extent

5 = To a fairly large extent
6 = To a great extent
7 = To a very great extent

52. To what extent are the requirements placed on you in your job in line with your interests and values?
53. To what extent does your present job fulfill your expectations of what a good job involves?
54. To what extent does your job require communication between workers?
55. To what extent are group meetings used to solve problems and establish goals and objectives within your work group?
56. To what extent does your job provide you with the opportunity to accomplish something worthwhile?
57. To what extent does your job enable you to use your natural talents?
58. To what extent does your job utilize your training for that job?
59. To what extent are you allowed to provide ideas for solving job related problems?
60. To what extent are your ideas utilized in solving job related problems?
61. To what extent does your job provide you with the chance to finish completely the piece of work you have begun?
62. To what extent does your job require you to do many different things, using a variety of your talents and skills?
63. To what extent does your job provide the chance to know for yourself when you do a good job, and to be responsible for your own work?

SUPERVISOR INVENTORY

Instructions

The statements below describe characteristics of managers or supervisors. Indicate your agreement by choosing the statement below which best represents your attitude concerning your supervisor.

NA = Not Applicable
1 = Strongly Disagree
2 = Moderately Disagree
3 = Slightly Disagree

4 = Neither Agree nor Disagree
5 = Slightly Agree
6 = Moderately Agree
7 = Strongly Agree

Select the corresponding number and mark your answer on the separate answer sheet.

- 64. My supervisor is a good planner.
- 65. My supervisor represents the group at all times.
- 66. My supervisor establishes good work procedures.
- 67. My supervisor has made his/her responsibilities clear to the group.
- 68. My supervisor performs well under pressure.
- 69. My supervisor always helps me improve my performance.
- 70. My job performance has improved due to feedback received from my supervisor.
- 71. My supervisor frequently gives me feedback on how well I am doing my job.
- 72. My relationship with my supervisor is a good one.
- 73. My supervisor is cooperative.
- 74. My supervisor is supportive of the people who work for him/her.
- 75. My supervisor provides close control and firm direction.
- 76. My supervisor sets procedures and work to be done.
- 77. My supervisor spends too much time in minor details.
- 78. My supervisor requires paperwork that is not needed for the job.

ORGANIZATION CLIMATE INVENTORY

Instructions

Below are items which describe characteristics of your organization. Indicate your agreement by choosing the statement below which best represents your opinion concerning your organization.

NA = Not Applicable

1 = Strongly Disagree

2 = Moderately Disagree

3 = Slightly Disagree

4 = Neither Agree nor Disagree

5 = Slightly Agree

6 = Moderately Agree

7 = Strongly Agree

79. Your organization is very interested in the attitudes of the group members toward their jobs.
80. Your organization has a very strong interest in the welfare of its people.
81. I am very proud to work for this organization.
82. I could produce a higher quality product, if I only had more time.
83. This organization rewards individuals based on performance.
84. I am uncertain I will still have a job with this organization in the future.
85. People equal to or above my supervisor's position give me tasks without going through my supervisor.
86. There are far too many policies and regulations constricting my effective job performance.
87. I could do my job better if the organization had fewer rules.
88. My relationship with my peers is a good one.
89. There are very few disagreements or conflicts between myself and my co-workers.
90. I have to do things that should be done differently.
91. I work on unnecessary things.
92. I receive an assignment without adequate resources and materials to execute it.
93. I am consulted on decisions that affect my general work area.
94. I am just a pawn, subject to the whims of personnel above me.
95. I do not really have to worry about my output, it would be almost impossible for me to lose my job even if I only put in minimal effort.

JOB SATISFACTION QUESTIONNAIRE

Instructions

The items below relate to your job or the Air Force as a profession. Indicate how satisfied or dissatisfied you are with each item. Choose the statement below which best describes your degree of satisfaction or dissatisfaction.

NA = Not Applicable

1 = Extremely dissatisfied

2 = Moderately dissatisfied

3 = Slightly dissatisfied

4 = Neither satisfied nor dissatisfied

5 = Slightly satisfied

6 = Moderately satisfied

7 = Extremely satisfied

96. Progression Opportunities: The chance to rise up the ladder to upper level management positions.
97. Feeling of Helpfulness: The chance to help people and improve their welfare through the performance of your job.
98. Family Attitude Toward Job: The recognition and the pride your family has in the work you do.
99. Work Itself: The challenge, interest, importance, variety, and feelings of accomplishment you receive from your work.
100. Job Security
101. Acquired Valuable Skills: The chance to acquire valuable skills in your job which prepare you for future opportunities.
102. Your Job as a Whole

ASSERTIVENESS INVENTORY

Instructions

The following questions will attempt to measure your level of assertiveness. Indicate your agreement with the statement by selecting the answer which best represents your opinion.

1 = Not at all

2 = To a very little extent

3 = To a little extent

4 = To a moderate extent

5 = To a fairly large extent

6 = To a great extent

7 = To a very great extent

103. To what extent do you call it to his/her attention when a person is highly unfair?
104. To what extent do you speak out or protest when someone takes your place in line?

1 = Not at all
2 = To a very little extent
3 = To a little extent
4 = To a moderate extent

5 = To a fairly large extent
6 = To a great extent
7 = To a very great extent

105. To what extent do you call attention to the situation in which a latecomer is waited on before you?
106. To what extent do you insist that your landlord (mechanic, repairman, etc) make repairs that are his/her responsibility to make?
107. To what extent are you able to speak up for your viewpoint when you differ with a person you respect?

SOCIAL ENVIRONMENT INVENTORY

Instructions

The items below relate to your social life away from your job. Indicate how much you agree/disagree with each item. Choose the statement below which best describes your degree of agreement.

NA = Not Applicable
1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree

4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

108. I am extremely well known in my community, and am well respected for my contributions.
109. I am extremely involved in social activities outside my job.
110. I am frequently asked to contribute time and effort in community projects.
111. I have several hobbies and/or interests apart from work.
112. I lead an active fulfilling social life.
113. I find satisfaction in doing something I enjoy.
114. I often find that my involvement in community affairs interferes with time I would be better off spending on my job.
115. I feel guilty when I'm not working on furthering my career.

PERCEIVED STRESS

This portion of the questionnaire relates primarily to the extent to which you perceive yourself as under stress and to what you consider the prime contributor.

Using the scale below indicate the extent to which you agree with the statement.

NA = Not Applicable

1 = Strongly Disagree

2 = Moderately Disagree

3 = Slightly Disagree

4 = Neither Agree nor Disagree

5 = Slightly Agree

6 = Moderately Agree

7 = Strongly Agree

116. I am extremely frustrated by my fight for social acceptance away from the job.
117. I feel highly tense because I can't seem to progress in my job.
118. I feel a great deal of stress and anxiety in the performance of my job.
119. My unfulfilled homelife greatly adds to my frustration.
120. My lifestyle away from my job is extremely tense and stressful.
121. I must admit that it makes me angry when other people interfere with my daily activity.
122. I find that a well-ordered mode of life with regular hours is congenial to my temperament.
123. It bothers me when something unexpected interrupts my daily routine.
124. I don't like to undertake any project unless I have a pretty good idea as to how it will turn out.
125. I find it hard to set aside a task that I have undertaken, even for a short time.

FAMILY INVENTORY

Instructions

Indicate your agreement with the statement by selecting the answer which best represents your opinion.

1 = Not at all

2 = To a very little extent

3 = To a little extent

4 = To a moderate extent

5 = To a fairly large extent

6 = To a great extent

7 = To a very great extent

126. To what extent are things going well between you and your wife/husband?
127. To what extent are there negative feelings between you and your wife/husband when you are together?

- 1 = Not at all
- 2 = To a very little extent
- 3 = To a little extent
- 4 = To a moderate extent

- 5 = To a fairly large extent
- 6 = To a great extent
- 7 = To a very great extent

- 128. To what extent are you satisfied with your family life?
- 129. To what extent is your relationship with your spouse a good one?
- 130. To what extent do you and your wife/husband enjoy your time together?

FOOD CONSUMPTION INVENTORY

Instructions

Use the scale below to answer the questions for this section.

- | | |
|--|--|
| NA = Never consume (eat or drink) the item(s). | 5. 6-8 times each <u>week</u> . |
| 1 = 2-3 times each <u>month</u> (or less). | 6. 9-11 times each <u>week</u> . |
| 2 = Once each <u>week</u> . | 7. 12 or more times each <u>week</u> . |
| 3 = 2-3 times each <u>week</u> . | |
| 4 = 4-5 times each <u>week</u> . | |

How many times do you consume the following food items?

- 131. Eggs
- 132. Dairy products (whole milk, ice cream, cheese, etc. - skim milk does not count).
- 133. Beef and Pork (steak, hamburger, sausage, spare ribs, etc.)
- 134. Fried foods (chicken, french fries, potato chips, etc.)
- 135. Butter (not margarine) and/or sour cream.

BACKGROUND INFORMATION

Instructions

The last section of this survey concerns your background. Please darken the space on the optical scan form which corresponds with your response to each question.

- 136. Total months in this organization is:
 - 1 Less than 1 month.
 - 2 More than 1 month, less than 6 months.
 - 3 More than 6 months, less than 12 months.
 - 4 More than 12 months, less than 18 months.
 - 5 More than 18 months, less than 24 months.
 - 6 More than 24 months, less than 36 months.
 - 7 More than 36 months

137. Total months experience in present job is:

- 1 Less than 1 month.
- 2 More than 1 month, less than 6 months.
- 3 More than 6 months, less than 12 months.
- 4 More than 12 months, less than 18 months.
- 5 More than 18 months, less than 24 months.
- 6 More than 24 months, less than 36 months.
- 7 More than 36 months.

138. Your race is:

- 1 American Indian or Alaskan Native
- 2 Asian or Pacific Islander
- 3 Black, not of Hispanic Origin
- 4 Hispanic
- 5 White, not of Hispanic Origin
- 6 Other

139. Your sex is:

- 1 Male
- 2 Female

140. Your highest educational level obtained was:

- 1 Non-high school graduate
- 2 High school graduate or GED
- 3 Some college work
- 4 Bachelor's degree
- 5 Some graduate work
- 6 Master's degree
- 7 Doctoral degree

141. How many people do you directly supervise (i.e., those for which you write performance reports)?

- | | |
|----------|--------------|
| 1 None | 5 9 to 12 |
| 2 1 to 2 | 6 13 or 20 |
| 3 3 to 5 | 7 21 or more |
| 4 6 to 8 | |

142. Does your supervisor actually write your performance report?

- 1 Yes
- 2 No

143. Your work requires you to work primarily:

- 1 Alone
- 2 With one or two people
- 3 As a small group team member (3-5 people)
- 4 As a large group team member (6 or more people)
- 5 Other

144. How stable are your work hours?

- 1 Highly Stable--Routine 8 hours a day.
- 2 Very Stable--Nearly routine 8 hour day.
- 3 Moderately Stable--Shift work which periodically changes.
- 4 Slightly Unstable--Irregular working hours.
- 5 Highly Unstable--Frequent business trip or away from office.

145. How stable is your work location?

- 1 Highly Stable--Six to eight hours per day at one central location, office or desk.
- 2 Very Stable--At least half the day at office or desk.
- 3 Slightly Unstable--Work predominately away from desk.
- 4 Highly Unstable--Constantly on the road (i.e., traveling salesman).
- 5 Periodically Unstable--Work at one location for a short period of time then another location for a short period of time (i.e., oil well driller, consultant, doctor--working hospital and office, etc.).

146. Your work schedule is basically:

- 1 Shift work, usually days.
- 2 Shift work, usually swing shift.
- 3 Shift work, usually nights.
- 4 Shift work, usually days and nights.
- 5 Daily work only.
- 6 Crew schedule.
- 7 Other.

147. Have you been diagnosed as having coronary artery disease or coronary heart disease?

- 1 Yes
- 2 No

148. Have you been diagnosed as having an ulcer?

- 1 Yes
- 2 No

149. Do you have a problem with your blood pressure?

NA = Don't Know

- 1 Yes, high blood pressure
- 2 Yes, Low blood pressure
- 3 No

Do you have frequent or severe headaches?

- 1 Yes
- 2 No

151. If you are a jogger, the average number of miles you jog per day is:

- 1 I do not jog.
- 2 1 mile.
- 3 2 miles.
- 4 3 miles.
- 5 4 miles.
- 6 5 miles.
- 7 More than 5 miles.

152. If you smoke cigarettes, you smoke the following number of cigarettes:

- 1 I do not smoke cigarettes.
- 2 Less than 5 per day.
- 3 6-10 per day.
- 4 11-20 per day.
- 5 21-30 per day.
- 6 31-40 per day.
- 7 More than 40 per day.

153. If you smoke a pipe or cigar, you smoke the following number of pipe bowls or cigars:

- 1 I do not smoke a pipe or cigar.
- 2 Less than 2 bowls or cigars per day.
- 3 2-4 bowls or cigars per day.
- 4 5-6 bowls or cigars per day.
- 5 7-8 bowls or cigars per day.
- 6 9-10 bowls or cigars per day.
- 7 More than 10 bowls or cigars per day.

154. Consult the chart on the next page to answer the following question. Your weight category (according to height) is:

155. Which statement most accurately describes your exercise program?

- 1 I do not participate in any exercise program as I get sufficient exercise through the exertions of my job.
- 2 I do not exercise regularly.
- 3 I participate in a light exercise program (hiking, bowling, golf).
- 4 I participate in moderate exercise program (tennis, baseball, ping pong).
- 5 I participate in a strenuous exercise program (jogging, football, swimming).

156. I participate in an exercise program:

NA = I do not participate in an exercise program.

- 1 At least once a week.
- 2 At least twice a week.
- 3 At least three times a week.
- 4 At least four times a week.
- 5 At least five times a week.
- 6 More than five times a week.

NOTE: Men - use top table; women use bottom table.

Locate your height; move across the row until you find your weight. The number at the top of your weight column is your weight category. Mark this number on your answer sheet.

MEN							
WEIGHT CATEGORY							
Height	1 This Weight and Under	2	3	4	5	6	7 This Weight or Greater
6' 4"	138	139-155	156-171	172-190	191-208	209-227	228
6' 3"	134	135-150	151-166	167-185	186-203	204-221	222
6' 2"	130	131-146	147-161	162-180	181-197	198-215	216
6' 1"	126	127-142	143-157	158-175	176-192	193-209	210
6' 0"	123	124-139	140-153	154-170	171-186	187-203	204
5' 11"	120	121-135	136-149	150-165	166-181	182-197	198
5' 10"	117	118-131	132-146	147-160	161-175	176-191	192
5' 9"	114	115-128	129-141	142-156	157-171	172-186	187
5' 8"	110	111-124	125-137	138-152	153-166	167-181	182
5' 7"	107	108-121	122-133	134-147	148-161	162-175	176
5' 6"	104	105-117	118-129	130-143	144-156	157-171	172
5' 5"	102	103-114	115-126	127-139	140-152	153-166	167
5' 4"	99	100-112	113-123	124-136	137-149	150-162	163
5' 3"	97	98-109	110-120	121-133	134-145	146-159	160
5' 2"	94	95-106	107-117	118-129	130-141	142-154	155

WOMEN							
WEIGHT CATEGORY							
Height	1 This Weight and Under	2	3	4	5	6	7 This Weight or Greater
6' 0"	115	116-130	131-143	144-159	160-174	176-190	191
5' 11"	112	113-126	127-139	140-155	156-170	171-185	186
5' 10"	109	110-122	123-135	136-151	152-165	166-180	181
5' 9"	106	107-119	120-131	132-147	148-161	162-175	176
5' 8"	102	103-115	116-127	128-143	144-156	157-171	172
5' 7"	99	100-112	113-123	124-139	140-152	153-166	167
5' 6"	96	97-108	109-119	120-135	136-150	149-161	162
5' 5"	93	94-104	105-115	116-130	131-142	143-155	156
5' 4"	90	91-102	103-112	113-126	127-138	139-150	151
5' 3"	88	89- 99	100-109	110-122	123-133	134-145	146
5' 2"	86	87- 96	97-106	107-119	120-130	131-142	143
5' 1"	83	84- 94	95-103	104-116	117-127	128-138	139
5' 0"	81	82- 91	92-100	101-113	114-123	124-135	136
4' 11"	78	79- 88	89- 97	98-110	111-120	121-131	132
4' 10"	77	78- 86	87- 95	96-107	108-117	118-127	128

157. Which of the following statements best describe your marital status?

NA Not married - No children

- 1 Married - Spouse is employed outside home.
- 2 Married - Separated due to employment.
- 3 Married - Separated by choice.
- 4 Married - Spouse is not employed.
- 5 Married - Spouse is not employed - separated due to employment.
- 6 Divorced - Do not have custody of children.
- 7 Single parent.

158. If I have my own way, I will not be working for my present organization a year from now.

- 1 Strongly Disagree
- 2 Slightly Disagree
- 3 Neither Agree nor Disagree
- 4 Slightly Agree
- 5 Strongly Agree

159. I really think that I will be at this organization a year from now (i.e., US Air Force, Industry, Hospital, etc.).

- 1 Strongly Disagree
- 2 Slightly Disagree
- 3 Neither Agree nor Disagree
- 4 Slightly Agree
- 5 Strongly Agree

160. Are you currently (within the last week) taking any prescribed or non-prescribed medication?

- 1 No.
- 2 Yes. If yes, then turn to the next page and fill in your identification number (the one on the upper right corner of your optical scan form) and complete the page.

PLACE I.D. NUMBER HERE

1. Medication Name:

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

2. Use (if known):

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

3. Dosage (if known):

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

APPENDIX C
LIFE EVENTS SURVEY

GENERAL INFORMATION AND INSTRUCTIONS

1. The Life Events Survey (LES) is a tool designed to identify the events in your life that you find stressful and determine the extent of personal stress resulting from these events.
2. The LES lists eighty-three (83) life events, which are believed to cause personal stress. Personal stress is defined here as your physical and emotional responses, both immediate and delayed, to the conditions surrounding a life event.
3. The life events are divided into three sections: major life events, minor life events, and continuous life events. For each life event which has happened or is happening to you, please provide the following information:
 - a. Indicate whether it was a positive (P) or negative (N) experience.
 - b. Except for the continuous life events, indicate how many times the major and minor life events have happened to you during the specified time period.
 - c. Indicate to what extent the life event was or is stressful for you. The extent of stress is measured by the following seven (7) point scale:

1 = insignificant	5 = fairly large
2 = very little	6 = large
3 = little	7 = very significant
4 = moderate	
4. Each of us respond to life events differently because of differences in our personalities, our abilities to cope, and our experience with handling a particular life event. Therefore, it is important that you answer all items honestly. This is the only way an accurate evaluation can be made of life events and the stress they cause.
5. Your individual responses will be held in the strictest confidence, and will not be provided to any organization or persons. Only personnel directly involved in this research will have access to your completed LES.

PRIVACY STATEMENT

In accordance with paragraph 8, AFR 12-35, the following information is provided as required by the Privacy Act of 1974.

a. Authority

(1) 5 U.S.C. 301, Departmental Regulations, and/or

(2) 10 U.S.C. 8012, Secretary of the Air Force, Powers, Duties, Delegation by Compensation, and/or

(3) DOD Instruction 1100.13, 17 Apr 68, Surveys of Department of Defense Personnel, and/or

(4) AFR 30-23, 22 Sep 76, Air Force Personnel Survey Program.

b. Principal Purpose. The survey is being conducted to collect information to be used in research aimed at illuminating and providing inputs to the solution of problems of interest to the Air Force and/or DOD.

c. Routine Uses. The survey data will be converted to information for use in research of management related problems. Results of the research, based on the data provided, will be included in written master's theses and may also be included in published articles, reports, or text. Distribution of the results of the research, based on the survey data, whether in written form or presented orally, will be unlimited.

d. Participation in this survey is entirely voluntary.

e. No adverse action of any kind may be taken against any individual who elects not to participate in any or all of this survey.

SECTION I

READ EACH "MAJOR" LIFE EVENT. HAS IT HAPPENED TO YOU?

If NO --- read the next LIFE EVENT.

If YES --- how many times in the last 2 YEARS or so?

If YES ---

was it a POSITIVE (P) or NEGATIVE (N) experience for you?

If YES --- to what extent was it stressful for you? (circle one)

1=insignificant 4=moderate 6=large
2=very little 5=fairly large 7=very significant
3=little

EXAMPLE:

Getting injured	(N)	<u>2</u>	1	2	3	4	5	6	7
1. Family separation (other than marital separation)	()	—	1	2	3	4	5	6	7
2. Change in number of family get-togethers.	()	—	1	2	3	4	5	6	7
3. Birth of a child.	()	—	1	2	3	4	5	6	7
4. Adoption of a child.	()	—	1	2	3	4	5	6	7
5. Addition of a non-immediate family dependent to your home.	()	—	1	2	3	4	5	6	7
6. Offspring leaves home.	()	—	1	2	3	4	5	6	7
7. Pregnancy	()	—	1	2	3	4	5	6	7
8. Loss experienced when close-one moves away.	()	—	1	2	3	4	5	6	7
9. Getting married.	()	—	1	2	3	4	5	6	7
10. Marriage of a close-one.	()	—	1	2	3	4	5	6	7
11. Change in marital relationship.	()	—	1	2	3	4	5	6	7
12. Getting divorced.	()	—	1	2	3	4	5	6	7
13. Divorce of a close-one.	()	—	1	2	3	4	5	6	7
14. Marital separation.	()	—	1	2	3	4	5	6	7
15. Marital reconciliation.	()	—	1	2	3	4	5	6	7
16. Sex difficulty.	()	—	1	2	3	4	5	6	7
17. Spouse is unfaithful.	()	—	1	2	3	4	5	6	7
18. Extramarital affair.	()	—	1	2	3	4	5	6	7
19. Changing jobs.	()	—	1	2	3	4	5	6	7
20. Change in job responsibility.	()	—	1	2	3	4	5	6	7
21. Change of job position (promotion/demotion).	()	—	1	2	3	4	5	6	7
22. Change of job supervisor.	()	—	1	2	3	4	5	6	7

READ EACH "MAJOR" LIFE EVENT. HAS IT HAPPENED TO YOU?

If NO --- read the next LIFE EVENT.

If YES --- how many times in the last 2 YEARS or so?

If YES ---

was it a POSITIVE (P) or NEGATIVE (N) experience for you?

If YES --- to what extent was it stressful for you? (circle one)

1=insignificant 4=moderate 6=large
2=very little 5=fairly large 7=very significant
3=little

23. Retirement.	()	___	1	2	3	4	5	6	7
24. Change careers.	()	___	1	2	3	4	5	6	7
25. Experience job inspection/evaluation.	()	___	1	2	3	4	5	6	7
26. Confrontation with supervisor.	()	___	1	2	3	4	5	6	7
27. Confrontation with co-workers.	()	___	1	2	3	4	5	6	7
28. Change of employment status.	()	___	1	2	3	4	5	6	7
29. Change in employment status of spouse.	()	___	1	2	3	4	5	6	7
30. Buying a house.	()	___	1	2	3	4	5	6	7
31. Selling a house.	()	___	1	2	3	4	5	6	7
32. Making other large financial investments.	()	___	1	2	3	4	5	6	7
33. Experience a financial difficulty.	()	___	1	2	3	4	5	6	7
34. Change in income.	()	___	1	2	3	4	5	6	7
35. Experience a tax problem.	()	___	1	2	3	4	5	6	7
36. Change in commitment to church.	()	___	1	2	3	4	5	6	7
37. Change in religious beliefs.	()	___	1	2	3	4	5	6	7
38. Vacation.	()	___	1	2	3	4	5	6	7
39. Change in recreation routine.	()	___	1	2	3	4	5	6	7
40. Required to move.	()	___	1	2	3	4	5	6	7
41. House damaged.	()	___	1	2	3	4	5	6	7
42. Change in relationship with a close-one.	()	___	1	2	3	4	5	6	7
43. Counseling employees.	()	___	1	2	3	4	5	6	7
44. Death of a close-one.	()	___	1	2	3	4	5	6	7
45. Acute personal medical problem.	()	___	1	2	3	4	5	6	7
46. Acute medical problem of a close-one.	()	___	1	2	3	4	5	6	7

READ EACH "MAJOR" LIFE EVENT. HAS IT HAPPENED TO YOU?

If NO --- read the next LIFE EVENT.

If YES --- how many times in the last 2 YEARS or so?

If YES ---

was it a POSITIVE (P) or NEGATIVE (N) experience for you?

If YES --- to what extent was it stressful for you? (circle one)

1=insignificant 4=moderate 6=large
2=very little 5=fairly large 7=very
3=little significant

47. Change in social participation.	()	___	1	2	3	4	5	6	7
48. Victim of a crime.	()	___	1	2	3	4	5	6	7
49. Close-one is a victim of a crime.	()	___	1	2	3	4	5	6	7
50. Socializing with high officials.	()	___	1	2	3	4	5	6	7
51. Activities associated with holidays.	()	___	1	2	3	4	5	6	7
52. Legal problems.	()	___	1	2	3	4	5	6	7
53. Outstanding personal achievement.	()	___	1	2	3	4	5	6	7
54. Starting school/training.	()	___	1	2	3	4	5	6	7
55. Graduating from school/training.	()	___	1	2	3	4	5	6	7
56. Close-one is starting school/training.	()	___	1	2	3	4	5	6	7
57. Close-one is graduating from school/training.	()	___	1	2	3	4	5	6	7
58. Academic efforts (exam/paper).	()	___	1	2	3	4	5	6	7

SECTION 2

READ EACH "MINOR" LIFE EVENT. HAS IT HAPPENED TO YOU?

If NO --- read the next LIFE EVENT.

If YES --- how many times in the last 2 WEEKS or so?

If YES ---

was it a POSITIVE (P) or NEGATIVE (N) experience for you?

If YES --- to what extent was it stressful for you? (circle one)

1=insignificant 4=moderate 6=large
2=very little 5=fairly large 7=very significant
3=little

EXAMPLE:

Getting injured	(N)	<u>1</u>	1	2	3	4	5	6	7
59. Briefing superiors.	()	___	1	2	3	4	5	6	7
60. Job requires much traveling.	()	___	1	2	3	4	5	6	7
61. Car problems.	()	___	1	2	3	4	5	6	7
62. Dealing with financial problems of a close-one.	()	___	1	2	3	4	5	6	7
63. Home maintenance.	()	___	1	2	3	4	5	6	7
64. Supervising peers.	()	___	1	2	3	4	5	6	7
65. Driving in rush hour traffic.	()	___	1	2	3	4	5	6	7
66. Change in daily routine.	()	___	1	2	3	4	5	6	7
67. Frequent social obligations.	()	___	1	2	3	4	5	6	7
68. Misplacing or losing things.	()	___	1	2	3	4	5	6	7

READ EACH "CONTINUOUS" LIFE EVENT. IS IT HAPPENING TO YOU?

If NO --- read the next LIFE EVENT.

If YES --- to what extent is it stressful for you?

If YES ---

is it a POSITIVE (P) or NEGATIVE (N) experience for you?

1= insignificant

4= moderate

6= large

2= very little

5= fairly large

7= very

3= little

significant

EXAMPLE:

Office bickering.	(N)	1	2	3	4	5	6	7
69. Responsibility of being a parent.	()	1	2	3	4	5	6	7
70. Family bickering.	()	1	2	3	4	5	6	7
71. Responsibility of marriage.	()	1	2	3	4	5	6	7
72. Uncomfortable job environment.	()	1	2	3	4	5	6	7
73. Job responsibility and pressures	()	1	2	3	4	5	6	7
74. Inability to accomplish job.	()	1	2	3	4	5	6	7
75. Continuous financial problems.	()	1	2	3	4	5	6	7
76. Continuous church responsibilities.	()	1	2	3	4	5	6	7
77. Frequent recreation routine (daily workout).	()	1	2	3	4	5	6	7
78. Chronic personal medical problem.	()	1	2	3	4	5	6	7
79. Chronic medical problem of a close-one.	()	1	2	3	4	5	6	7
80. Eating or drinking too much.	()	1	2	3	4	5	6	7
81. Maintaining physical appearance/self image.	()	1	2	3	4	5	6	7
82. Maintaining life style.	()	1	2	3	4	5	6	7
83. Pressures of attending school/training.	()	1	2	3	4	5	6	7

ADDITIONAL LIFE EVENTS

In the blanks provided below, list the major, minor, and continuous life events, which you believe were not covered by the LES. In the spaces provided please indicate the frequency of occurrence, and whether it was a positive (P) or negative (N) experience.

EXAMPLE:

Purchase of a pet 5 P

<u>LIFE EVENT</u>	<u>FREQUENCY</u>	<u>POS (P)/NEG (N)</u>

AD-A134 278

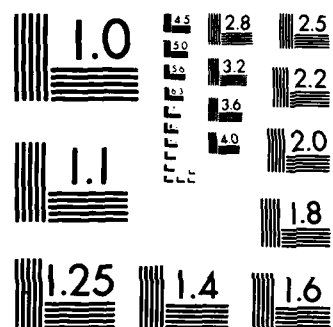
STRESSFUL LIFE EVENTS: THEIR RELATIONSHIPS WITH
CORONARY HEART DISEASE(U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST. C C SPARKMAN
SEP 83 AFIT-LSSR-22-83 F/G 6/5

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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963 A

APPENDIX D

**SUMMARY OF THE SAMPLED LIFE EVENTS SURVEY RESPONSES :
MAJOR, MINOR, AND CONTINUOUS STRESSFUL LIFE EVENTS --
IN ORDER OF LIFE EVENTS AND
IN ORDER OF THE NUMBER OF CASES**

Major Life Events: Number of Cases,
Positive Versus Negative Perception,
and Extent of Perceived Stress

Life Event	Number of Cases	Perception of Stress		Extent of Perceived Stress							
		Pos	Neg	Insignificant	1	2	3	4	5	6	7
1	45	15	30		4	7	7	14	7	4	2
2	26	11	15		1	3	5	10	5	1	1
3	9	7	2		1	1	0	2	2	2	1
4	0	0	0		0	0	0	0	0	0	0
5	4	3	1		0	1	1	1	0	1	0
6	10	3	7		1	0	2	4	2	1	0
7	9	7	2		0	1	1	4	0	1	2
8	19	1* 6	12		0	3	4	4	4	4	0
9	9	7	2		0	1	1	0	0	5	2
10	12	11	1		0	2	2	6	0	0	2
11	15	3	12		0	0	1	0	2	3	9
12	12	4	8		1	0	1	0	1	1	8
13	7	1	6		0	1	0	0	4	1	1
14	15	4	11		0	1	0	2	4	4	4
15	7	5	2		0	1	0	0	3	2	1
16	16	0	16		0	0	3	3	5	3	2
17	7	1	6		0	0	1	0	0	3	3
18	14	8	6		1	0	3	2	3	2	3
19	49	1* 34	14	1**	1	2	2	12	11	9	11
20	51	1* 32	18		1	1	3	18	11	9	8
21	38	30	8		6	2	3	10	5	8	4
22	56	31	25		4	4	7	17	10	7	7
23	3	0	3		0	0	0	0	2	0	1
24	8	7	1		1	0	0	2	1	1	3
25	42	27	15		5	6	8	12	8	2	1
26	40	8	32		2	2	4	3	9	8	12
27	30	5	25		2	1	4	7	6	4	6
28	9	7	2		1	0	0	4	2	1	1
29	19	11	8		1	0	3	6	6	0	3

* Number of incorrect entries for perception.

** Number of incorrect entries for extent of perceived stress.

Major Life Events: Number of Cases,
Positive Versus Negative Perception,
and Extent of Perceived Stress
(Continued)

Life Event	Number of Cases	Perception of Stress		Extent of Perceived Stress							
		Pos	Neg	Insignificant	1	2	3	4	5	6	7
30	36	30	6		1	2	5	11	8	3	6
31	23	14	9	2**	0	1	4	4	8	1	3
32	40	31	9		3	5	6	11	9	5	1
33	27	27	0		0	1	6	7	4	3	6
34	46	33	13		7	6	5	11	12	1	4
35	16	2	14		1	4	3	4	4	0	0
36	13	11	2		1	3	1	3	1	3	1
37	5	4	1		0	1	0	2	0	2	0
38	61	57	4		8	9	10	12	9	7	6
39	21	10	11		2	3	2	7	6	1	0
40	34	1* 17	16		3	3	3	9	9	4	3
41	8	1	7		0	0	2	1	2	2	1
42	24	9	15		0	1	1	6	4	4	8
43	18	8	10		0	2	5	4	6	0	1
44	24	4	20		0	1	0	7	5	3	8
45	14	1	13		1	0	3	2	3	0	5
46	32	1* 3	28		0	0	2	9	9	6	6
47	22	1* 11	10		2	2	3	9	4	1	1
48	7	0	7		0	2	1	1	0	1	2
49	8	1* 1	6		0	0	0	2	3	1	2
50	24	1* 18	5		2	4	6	9	1	1	1
51	50	42	8		2	5	11	17	6	4	5
52	15	1* 0	14		1	0	3	3	1	3	4
53	39	37	2	1**	4	6	5	10	7	3	3
54	32	24	8		1	2	3	13	5	5	3
55	13	13	0		3	3	1	4	1	1	0
56	23	18	5		5	3	3	5	3	2	2
57	17	16	1		3	3	0	2	5	2	2
58	33	13	20		2	2	7	13	6	1	2

* Number of incorrect entries for perception.

** Number of incorrect entries for extent of perceived stress.

Minor Life Events: Number of Cases,
Positive Versus Negative Perception,
and Extent of Perceived Stress

Life Event	Number of Cases	Perception of Stress		Extent of Perceived Stress						
		Pos	Neg	Insignificant	1	2	3	4	5	Very Significant
59	45	30	15		3	11	9	10	9	2
60	14	9	5		0	2	4	5	2	0
61	36	2	34		1	6	7	11	3	6
62	17	3	14		0	1	6	4	5	0
63	43	1*	12	30	1**	3	7	9	12	5
64	14		6	8		2	2	4	2	3
65	43	1*	5	37	2**	5	7	8	11	5
66	17	1*	9	7		0	3	6	4	4
67	19	1*	7	11		4	4	2	6	2
68	33		4	29		2	7	7	7	6

* Number of incorrect entries for perception.

** Number of incorrect entries for extent of perceived stress.

Continuous Life Events: Number of Cases,
Positive Versus Negative Perception,
and Extent of Perceived Stress

Life Event	Number of Cases	Perception of Stress		Extent of Perceived Stress							
		Pos	Neg	Insignificant	1	2	3	4	5	6	7
69	45	32	13		2	1	5	10	12	9	6
70	29	3	26		2	1	3	11	6	4	2
71	48	1*	36	11	2**	6	6	8	11	6	3
72	33	2	31		1	4	2	12	6	2	6
73	56	1*	22	33		2	4	12	15	14	3
74	19	2	17		1	0	2	8	5	2	1
75	19	1	18		1	0	4	8	3	2	1
76	14	11	3		3	4	2	1	2	2	0
77	28	25	3		6	3	4	6	3	3	3
78	14	1	13		1	1	1	6	3	1	1
79	27	3	24		0	0	4	5	12	4	2
80	26	2	24		0	4	7	7	3	2	3
81	60	33	27		3	6	10	23	9	5	4
82	39	28	11		3	6	7	12	5	4	2
83	22	5	17		0	1	3	4	7	6	0

* Number of incorrect entries for perception.

** Number of incorrect entries for extent of perceived stress.

**Major Life Events in Order of the Number of Cases:
Positive Versus Negative Perception,
and Extent of Perceived Stress**

Life Event	Number of Cases	Perception of Stress		Extent of Perceived Stress							
		Pos	Neg	Insignificant	1	2	3	4	5	6	7
38	61	57	4		8	9	10	12	9	7	6
22	56	31	25		4	4	7	17	10	7	7
20	51	1* 32	18		1	1	3	18	11	9	8
51	50	42	8		2	5	11	17	6	4	5
19	49	1* 34	14	1**	1	2	2	12	11	9	11
34	46	33	13		7	6	5	11	12	1	4
1	45	15	30		4	7	7	14	7	4	2
25	42	27	15		5	6	8	12	8	2	1
26	40	8	32		2	2	4	3	9	8	12
32	40	31	9		3	5	6	11	9	5	1
53	39	37	2	1**	4	6	5	10	7	3	3
21	38	30	8		6	2	3	10	5	8	4
30	36	30	6		1	2	5	11	8	3	6
40	34	1* 17	16		3	3	3	9	9	4	3
58	33	13	20		2	2	7	13	6	1	2
46	32	1* 3	28		0	0	2	9	9	6	6
54	32	24	8		1	2	3	13	5	5	3
27	30	5	25		2	1	4	7	6	4	6
33	27	27	0		0	1	6	7	4	3	6
2	26	11	15		1	3	5	10	5	1	1
42	24	9	15		0	1	1	6	4	4	8
44	24	4	20		0	1	0	7	5	3	8
50	24	1* 18	5		2	4	6	9	1	1	1
31	23	14	9	2**	0	1	4	4	8	1	3
56	23	18	5		5	3	3	5	3	2	2
47	22	1* 11	10		2	2	3	9	4	1	1
39	21	10	11		2	3	2	7	6	1	0

* Number of incorrect entries for perception.

** Number of incorrect entries for extent of perceived stress.

Major Life Events in Order of the Number of Cases:
Positive Versus Negative Perception,
and Extent of Perceived Stress
(Continued)

Life Event	Number of Cases	Perception of Stress		Extent of Perceived Stress							
		Pos	Neg	Insignificant	1	2	3	4	5	6	7
8	19	1*	6	12	0	3	4	4	4	4	0
29	19		11	8	1	0	3	6	6	0	3
43	18		8	10	0	2	5	4	6	0	1
57	17		16	1	3	3	0	2	5	2	2
35	16		2	14	1	4	3	4	4	0	0
16	16		0	16	0	0	3	3	5	3	2
11	15		3	12	0	0	1	0	2	3	9
14	15		4	11	0	1	0	2	4	4	4
52	15	1*	0	14	1	0	3	3	1	3	4
18	14		8	6	1	0	3	2	3	2	3
45	14		1	13	1	0	3	2	3	0	5
36	13		11	2	1	3	1	3	1	3	1
55	13		13	0	3	3	1	4	1	1	0
10	12		11	1	0	2	2	6	0	0	2
12	12		4	8	1	0	1	0	1	1	8
6	10		3	7	1	0	2	4	2	1	0
3	9		7	2	1	1	0	2	2	2	1
7	9		7	2	0	1	1	4	0	1	2
9	9		7	2	0	1	1	0	0	5	2
28	9		7	2	1	0	0	4	2	1	1
24	8		7	1	1	0	0	2	1	1	3
41	8		1	7	0	0	2	1	2	2	1
49	8	1*	1	6	0	0	0	2	3	1	2
13	7		1	6	0	1	0	0	4	1	1
15	7		5	2	0	1	0	0	3	2	1
17	7		1	6	0	0	1	0	0	3	3
48	7		0	7	0	2	1	1	0	1	2
37	5		4	1	0	1	0	2	0	2	0
5	4		3	1	0	1	1	1	0	1	0
23	3		0	3	0	0	0	0	2	0	1
4	0		0	0	0	0	0	0	0	0	0

* Number of incorrect entries for perception.

** Number of incorrect entries for extent of perceived stress.

Minor Life Events in Order of the Number of Cases:
Positive Versus Negative Perception,
and Extent of Perceived Stress

Life Event	Number of Cases	Perception of Stress		Extent of Perceived Stress							
		Pos	Neg	Insignificant to Very Significant							
				1	2	3	4	5	6	7	
59	45		30	15	3	11	9	10	9	2	1
63	43	1*	12	30	1**	3	7	9	12	5	5
65	43	1*	5	37	2**	5	7	8	11	5	3
61	36		2	34		1	6	7	11	3	6
68	33		4	29		2	7	7	7	6	4
67	19	1*	7	11		4	4	2	6	2	1
62	17		3	14		0	1	6	4	5	0
66	17	1*	9	7		0	3	6	4	4	0
60	14		9	5		0	2	4	5	2	0
64	14		6	8		2	2	4	2	3	0

* Number of incorrect entries for perception.

** Number of incorrect entries for extent of perceived stress.

Continuous Life Events in Order of the Number of Cases:
Positive Versus Negative Perception,
and Extent of Perceived Stress

Life Event	Number of Cases	Perception of Stress		Extent of Perceived Stress						
		Pos	Neg	Insignificant to Very Significant						
				1	2	3	4	5	6	7
81	60	33	27	3	6	10	23	9	5	4
73	56	1*	22	33	2	4	12	15	14	3
71	48	1*	36	11	2**	6	6	8	11	6
69	45		32	13	2	1	5	10	12	9
82	39		28	11	3	6	7	12	5	4
72	33		2	31	1	4	2	12	6	2
70	29		3	26	2	1	3	11	6	4
77	28		25	3	6	3	4	6	3	3
79	27		3	24	0	0	4	5	12	4
80	26		2	24	0	4	7	7	3	2
83	22		5	17	0	1	3	4	7	6
74	19		2	17	1	0	2	8	5	2
75	19		1	18	1	0	4	8	3	2
76	14		11	3	3	4	2	1	2	2
78	14		1	13	1	1	1	6	3	1

* Number of incorrect entries for perception.

** Number of incorrect entries for extent of perceived stress.

APPENDIX E

PEARSON CORRELATION COEFFICIENT MATRICES

Positive and Negative Events

	Total Cholesterol	HDL Cholesterol	Ratio Total/HDL	Cortisol
Major SLE Occurance	-.2229 (76) p= .026	-.0572 (76) p= .312	-.1168 (76) p= .157	.1106 (69) p= .183
Major SLE Perception	-.0041 (76) p= .486	.0803 (76) p= .245	-.0926 (76) p= .213	-.0041 (69) p= .983
Major SLE Frequency	-.0699 (76) p= .274	-.0285 (76) p= .403	-.0464 (76) p= .345	.0000 (69) p= .992
Major SLE Significance	-.1885 (76) p= .052	-.0547 (76) p= .320	-.0643 (76) p= .290	.0818 (69) p= .252
Minor SLE Occurance	-.0111 (76) p= .462	-.0551 (76) p= .318	.0341 (76) p= .385	.0931 (69) p= .223
Minor SLE Perception	-.0437 (76) p= .354	-.0077 (76) p= .474	-.0587 (76) p= .307	-.0410 (69) p= .369
Minor SLE Frequency	-.0165 (76) p= .444	-.0697 (76) p= .275	.0325 (76) p= .390	.0186 (69) p= .440
Minor SLE Significance	.0672 (76) p= .282	-.0086 (76) p= .471	.0638 (76) p= .292	.1237 (69) p= .156
Continuous SLE Occurance	-.0216 (76) p= .426	.0195 (76) p= .434	-.0148 (76) p= .449	.0431 (69) p= .363
Continuous SLE Perception	-.1596 (76) p= .084	.0142 (76) p= .451	-.1538 (76) p= .092	.1106 (69) p= .183
Continuous SLE Significance	-.0703 (76) p= .273	.0658 (76) p= .286	-.0468 (76) p= .344	.1271 (69) p= .149

Positive Events

	Total Cholesterol	HDL Cholesterol	Ratio Total/HDL	Cortisol
Major SLE Occurance	-.1631 (76) p= .080	.0121 (76) p= .459	-.1407 (76) p= .113	.0842 (69) p= .246
Major SLE Perception	-.1631 (76) p= .080	.0121 (76) p= .459	-.1407 (76) p= .113	.0842 (69) p= .246
Major SLE Frequency	-.0637 (76) p= .292	.0379 (76) p= .373	-.0972 (76) p= .202	.2165 (69) p= .037
Major SLE Significance	-.1737 (76) p= .067	-.0015 (76) p= .495	-.1123 (76) p= .167	.1202 (69) p= .163
Minor SLE Occurance	-.0395 (76) p= .367	-.0381 (76) p= .372	-.0226 (76) p= .423	.0331 (69) p= .394
Minor SLE Perception	-.0395 (76) p= .367	-.0381 (76) p= .372	-.0226 (76) p= .423	.0331 (69) p= .394
Minor SLE Frequency	-.0690 (76) p= .277	-.0053 (76) p= .482	-.0377 (76) p= .373	-.0702 (69) p= .283
Minor SLE Significance	.0102 (76) p= .465	.0185 (76) p= .437	-.0437 (76) p= .354	.0810 (69) p= .254
Continuous SLE Occurance	-.1404 (76) p= .113	.0277 (76) p= .406	-.1351 (76) p= .122	.1161 (69) p= .171
Continuous SLE Perception	-.1404 (76) p= .113	.0277 (76) p= .406	-.1351 (76) p= .122	.1161 (69) p= .171
Continuous SLE Significance	-.2098 (76) p= .034	.0456 (76) p= .348	-.1453 (76) p= .105	.2669 (69) p= .013

Negative Events

	Total Cholesterol	HDL Cholesterol	Ratio Total/HDL	Cortisol
Major SLE Occurance	-.1740 (76) p= .066	-.1030 (76) p= .188	-.0211 (76) p= .428	.0905 (69) p= .230
Major SLE Perception	-.1740 (76) p= .066	-.1030 (76) p= .188	-.0211 (76) p= .428	.0905 (69) p= .230
Major SLE Frequency	-.0582 (76) p= .309	-.0835 (76) p= .237	.0268 (76) p= .409	.3345 (69) p= .002
Major SLE Significance	-.1250 (76) p= .141	-.0810 (76) p= .243	.0125 (76) p= .457	.0207 (69) p= .433
Minor SLE Occurance	.0281 (76) p= .405	-.0238 (76) p= .419	.0657 (76) p= .286	.0904 (69) p= .230
Minor SLE Perception	.0281 (76) p= .405	-.0238 (76) p= .419	.0657 (76) p= .286	.0904 (69) p= .230
Minor SLE Frequency	.0612 (76) p= .300	-.1466 (76) p= .103	.1407 (76) p= .113	.1808 (69) p= .069
Minor SLE Significance	.0779 (76) p= .252	-.0184 (76) p= .437	.1099 (76) p= .172	.0893 (69) p= .233
Continuous SLE Occurance	.1149 (76) p= .162	.0046 (76) p= .484	.1108 (76) p= .170	-.0623 (69) p= .305
Continuous SLE Perception	.1149 (76) p= .162	.0046 (76) p= .484	.1108 (76) p= .170	-.0623 (69) p= .305
Continuous SLE Significance	.1006 (76) p= .194	.0472 (76) p= .343	.0664 (76) p= .284	-.0799 (69) p= .257

APPENDIX F
MULTIPLE REGRESSION SUMMARY TABLES

Multiple Regression -- Total Population
Dependent Variable -- Total Cholesterol

Step	Variable	R Square	Simple R	Model Significance
1	Major SLE Occurance *	.050	-.223	
2	Minor SLE Significance	.080	.067	
3	Continuous SLE Perception	.092	-.160	
4	Minor SLE Frequency	.099	-.070	
5	Major SLE Perception	.106	-.004	
6	Minor SLE Frequency	.114	-.017	
7	Minor SLE Perception	.118	-.044	
8	Continuous SLE Significance	.121	-.070	
9	Continuous SLE Occurance	.129	-.022	
10	Major SLE Significance	.138	-.188	
11	Minor SLE Occurance	.140	-.011	**

Significance of the Individual Variables: * $p < 0.10$

** None of the models had a significance of less than 0.05

Multiple Regression -- Total Population
Dependent Variable -- HDL Cholesterol

Step	Variable	R Square	Simple R	Model Significance
1	Major SLE Perception	.006	.080	
2	Minor SLE Frequency	.013	-.070	
3	Continuous SLE Significance	.021	.066	
4	Major SLE Significance	.034	-.055	
5	Continuous SLE Occurance	.050	.019	
6	Major SLE Frequency	.114	-.017	
7	Minor SLE Occurance	.059	-.055	
8	Minor SLE Perception	.063	-.008	
9	Minor SLE Significance	.066	-.009	
10	Major SLE Occurance	.067	-.057	
11	Continuous SLE Perception	.140	-.011	*

* None of the models had a significance of less than 0.05

Multiple Regression -- Total Population
Dependent Variable -- Ratio of Total Cholesterol/HDL

Step	Variable	R Square	Simple R	Model Significance
1	Continuous SLE Perception	.024	-.154	
2	Major SLE Occurance	.032	-.117	
3	Minor SLE Significance	.044	.063	
4	Continuous SLE Significance	.050	-.047	
5	Major SLE Significance	.057	-.064	
6	Continuous SLE Occurance	.079	-.015	
7	Minor SLE Perception	.083	-.059	
8	Minor SLE Occurance	.085	.034	
9	Major SLE Perception	.087	-.093	
10	Major SLE Frequency	.088	-.046	
11	Minor SLE Frequency	.088	.033	*

* None of the models had a significance of less than 0.05

Multiple Regression -- Total Population
Dependent Variable -- Cortisol

Step	Variable	R Square	Simple R	Model Significance
1	Major SLE Frequency	* .119	.345	
2	Major SLE Occurance	.150	.111	
3	Continuous SLE Significance	.166	.127	
4	Minor SLE Frequency	.185	.019	
5	Continuous SLE Occurance	.208	.043	
6	Continuous SLE Perception	.236	.111	
7	Major SLE Significance	.262	.082	
8	Minor SLE Perception	.272	-.041	
9	Minor SLE Occurance	.272	.093	
10	Minor SLE Significance	.279	.124	.027
--	Major SLE Perception (did not enter the model)			

Significance of the Individual Variables: * p < 0.01

Multiple Regression -- Positive SLE Population
Dependent Variable -- Total Cholesterol

Step	Variable	R Square	Simple R	Model Significance
1	Continuous SLE Significance *	.044	-.210	
2	Minor SLE Significance	.064	.010	
3	Minor SLE Occurance	.085	-.040	
4	Continuous SLE Occurance	.102	-.140	
5	Major SLE Occurance	.110	-.163	
6	Minor SLE Frequency	.115	-.069	
7	Major SLE Frequency	.119	-.064	
8	Major SLE Significance	.120	-.174	**

Significance of the Individual Variables: * $p < 0.10$

** None of the models had a significance of less than 0.05

Multiple Regression -- Positive SLE Population
Dependent Variable -- HDL Cholesterol

Step	Variable	R Square	Simple R	Model Significance
1	Continuous SLE Significance	.002	.046	
2	Minor SLE Occurance	.007	-.038	
3	Minor SLE Significance	.032	.018	
4	Major SLE Frequency	.036	.038	
5	Major SLE Significance	.038	-.002	
6	Major SLE Occurance	.046	.012	
7	Continuous SLE Occurance	.048	.028	
8	Minor SLE Frequency	.049	-.005	*

* None of the models had a significance of less than 0.05

Multiple Regression -- Positive SLE Population
Dependent Variable -- Ratio of Total Cholesterol/HDL

Step	Variable	R Square	Simple R	Model Significance
1	Continuous SLE Significance	.021	-.145	
2	Major SLE Occurance	.026	-.141	
3	Minor SLE Occurance	.040	-.023	
4	Minor SLE Significance	.045	-.044	
5	Major SLE Significance	.052	-.112	
6	Minor SLE Frequency	.057	-.038	
7	Continuous SLE Occurance	.059	-.135	
8	Major SLE Frequency	.059	-.097	*

* None of the models had a significance of less than 0.05

Multiple Regression -- Positive SLE Population
Dependent Variable -- Cortisol

Step	Variable	R Square	Simple R	Model Significance
1	Continuous SLE Significance	* .071	.267	
2	Continuous SLE Occurance	* .131	.116	
3	Major SLE Frequency	.155	.217	
4	Major SLE Significance	* .214	.120	
5	Minor SLE Occurance	.224	.033	
6	Minor SLE Frequency	.227	-.070	
7	Minor SLE Significance	.228	.081	
8	Major SLE Occurance	.231	.084	.036

Significance of the Individual Variables: * p < 0.05

Multiple Regression -- Negative SLE Population
Dependent Variable -- Total Cholesterol

Step	Variable	R Square	Simple R	Model Significance
1	Major SLE Occurance	.030	-.174	
2	Continuous SLE Occurance	.066	.115	
3	Major SLE Significance	.079	-.125	
4	Major SLE Frequency	.089	-.058	
5	Continuous SLE Significance	.094	-.101	
6	Minor SLE Significance	.097	.078	
7	Minor SLE Occurance	.097	.028	
8	Minor SLE Frequency	.097	.061	*

* None of the models had a significance of less than 0.05

Multiple Regression -- Negative SLE Population
Dependent Variable -- HDL Cholesterol

Step	Variable	R Square	Simple R	Model Significance
1	Minor SLE Frequency	.022	-.147	
2	Major SLE Occurance	.027	-.103	
3	Continuous SLE Significance	.037	.047	
4	Continuous SLE Occurance	.045	.005	
5	Minor SLE Occurance	.050	-.023	
6	Major SLE Frequency	.058	-.083	
7	Minor SLE Significance	.058	-.018	
8	Major SLE Significance	.059	-.081	*

* None of the models had a significance of less than 0.05

Multiple Regression -- Negative SLE Population
Dependent Variable -- Ratio of Total Cholesterol/HDL

Step	Variable	R Square	Simple R	Model Significance
1	Minor SLE Frequency	.020	.141	
2	Continuous SLE Occurance	.027	.111	
3	Continuous SLE Significance	.037	.066	
4	Major SLE Occurance	.042	-.021	
5	Major SLE Significance	.077	.013	
6	Minor SLE Occurance	.078	.066	
7	Minor SLE Significance	.083	.110	
	Major SLE Frequency (did not enter the model)			*

* None of the models had a significance of less than 0.05

Multiple Regression -- Negative SLE Population
Dependent Variable -- Cortisol

Step	Variable		R Square	Simple R	Model Significance
1	Major SLE Frequency	**	.112	.335	
2	Major SLE Significance	*	.149	.021	
3	Continuous SLE Occurance		.161	-.062	
4	Minor SLE Significance		.173	.089	
5	Minor SLE Occurance		.178	.090	
6	Major SLE Occurance		.183	.090	.045
7	Minor SLE Frequency		.185	.181	***
8	Continuous SLE Significance		.186	-.080	***

Significance of the Individual Variables: * p < 0.10
** p < 0.01

*** Variable entered model.

Model significance exceeds 0.05 for this regression step.

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